

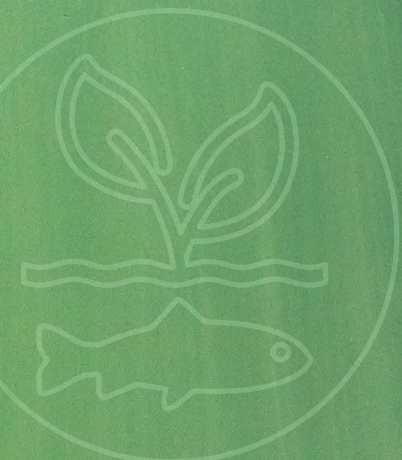
# ICPDR IKSD

International Commission  
for the Protection  
of the Danube River

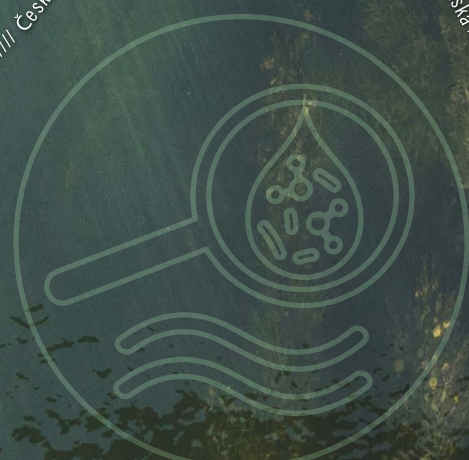
Internationale Kommission  
zum Schutz der Donau

# INTERIM REPORT

ON THE IMPLEMENTATION OF THE  
JOINT PROGRAM OF MEASURES IN  
THE DANUBE RIVER BASIN **2024**



Magyarország // Slovenija // Hrvatska // Bosna i Hercegovina // Srbija // Crna Gora // România // България // Moldova // Україна // Deutschland // Österreich // Česká republika // Slovensko // Magyarország // Slovenija // Hrvatska // Bosna i Hercegovina // Srbija // Crna Gora // România // България // Moldova





# TABLE OF CONTENTS

<b>1. Introduction</b>	<b>03</b>
<b>2. Progress in the implementation of the Joint Program of Measures</b>	<b>04</b>
2.1 Controlling Pollution of Surface Waters: Progressing but Unfinished Business	04
2.2 Hydromorphology in the spotlight of water management	13
2.3 Protection of Groundwater	22
2.4 Monitoring activities including Joint Danube Surveys	24
2.5 Additional issues (biodiversity, IAS, sediment quantity)	26
2.6 The Danube River Basin in a changing climate: Drought, water scarcity, extreme hydrological phenomena and other impacts	28
2.7 Inter-sectoral cooperation (including hydropower, navigation, agriculture) as key to success to create synergies and avoid potential conflicts	32
2.8 Sturgeons as flagship species and indicator for ecological status of Danube River Basin's waters	35
2.9 Water and Economics	39
2.10 Danube Together: A Shared Vision through Public Engagement	42
<b>3. Conclusions and outlook</b>	<b>46</b>

## IMPRINT

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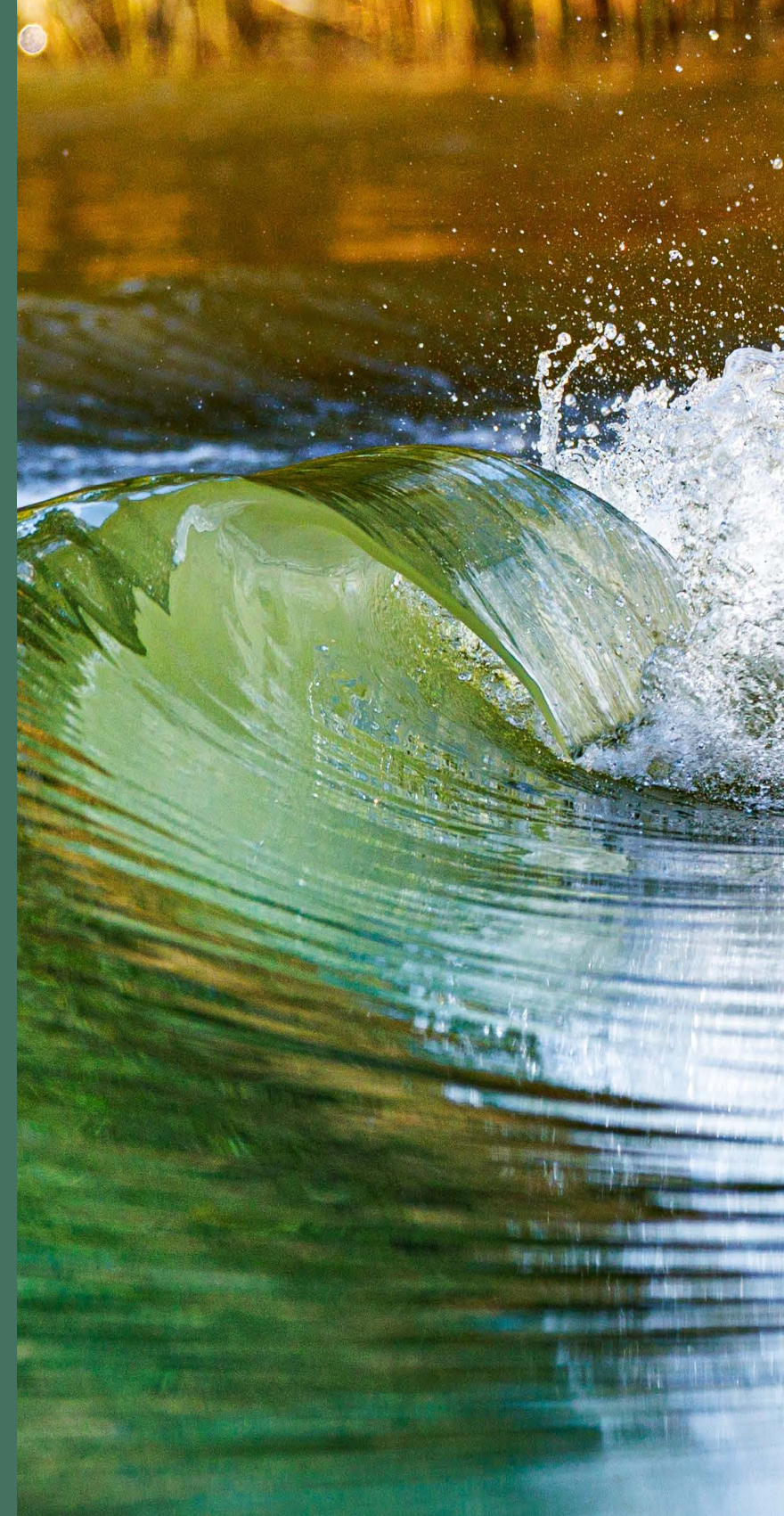
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**DISCLAIMER:** The data in this report has been dealt with, and is presented to the best of our knowledge. Nevertheless inconsistencies cannot be ruled out.



# 1. INTRODUCTION

**The Danube River Basin covers more than 800,000 square kilometres – 10% of continental Europe – and extends into the territories of 19 countries. This makes it the most international river basin in the world. About 79 million people reside in the basin. Its ecological diversity, from plant and animal species to critical habitats, is also highly valued.**

Rivers, lakes, transitional and coastal waters, as well as groundwater, are a vital natural resource of the Danube River Basin: they provide drinking water, crucial habitats for many different types of wildlife, and are an important resource for industry, agriculture, transport, energy production and recreation. A significant proportion of water resources are exposed to environmental pollution or other potentially damaging pressures. Protecting and improving the waters and environment of the Danube River Basin is therefore essential for the natural environment, the sustainable development of the region and the long-term health, well-being and prosperity of the population of the Danube region.

The Danube River Protection Convention (DRPC), signed by Danube countries in 1994, provides the legal framework for cooperation on water issues within the Danube Basin. All Danube countries with territories > 2,000 km<sup>2</sup> in the Danube River Basin are Contracting Parties to the DRPC: Austria (AT), Bosnia and Herzegovina (BA), Bulgaria (BG), Croatia (HR), the Czech Republic (CZ), Germany (DE), Hungary (HU), Republic of Moldova (MD), Montenegro (ME), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI) and Ukraine (UA). In addition, the European Union (EU) is also a Contracting Party to the DRPC.

The International Commission for the Protection of the Danube River (ICPDR) is the organisation which was established by the DRPC Contracting Parties to facilitate multilateral cooperation and for implementing the DRPC.

Since the year 2000, the European Union has been one of the main drivers for river basin management in the Danube region, particularly through its EU Water Framework Directive, which is one of the most comprehensive water legislation in the world. The purpose of the Directive is to establish a framework for the protection and enhancement of the status of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater, and to ensure a sustainable use of water resources. It aims to ensure that all waters meet 'good status' and to avoid their deterioration, which are the central objectives of the WFD. In the frame of the ICPDR also the five non-EU MS (BA, MD, ME, RS and UA) committed to make all efforts to implement the Directive throughout the whole basin.

In addition to the work under the EU WFD, the ICPDR also serves as the platform to implement the EU Floods Directive (EU FD) in the transboundary context of the Danube River Basin. Aiming to reduce flood risks, the EU FD promotes the "Solidarity Principle" that prevents countries from simply exporting their flood problems to downstream neighbours and to protect people from the damage caused by floods.

In the year 2021, the ICPDR published the updates of the Danube River Basin Management Plan (DRBMP) and Danube Flood Risk Management Plan (DFRMP). Both plans were coordinated and synergised in keeping with the environmental objectives as stipulated by the EU WFD. Since the publication of the first DRBMP in the year 2009 as well as the first DFRMP in the year

2015, the ICPDR updates the DRBMP as well as DFRMP every six years as requested by the EU WFD, and the EU FD respectively. The DRBMP Update 2021 identifies the priorities for joint water resources management throughout the Danube River Basin for the years 2022 to 2027. The DRBMP Update 2021 includes updated assessments of the main pressures impacting the Danube basin's waters, updated information on water status and progress achieved, as well as the joint further actions agreed by the Danube countries to be undertaken until 2027. While the ICPDR serves as the coordinating platform to compile multilateral and basin-wide issues, national River Basin Management Plans (RBMPs) at sub-basin/national level, respectively sub-unit level complement river basin management planning in the Danube River Basin. All plans together provide the full set of information for the whole Danube River Basin, covering all waters (surface as well as groundwater). In most of the Danube countries the first RBMPs according to the EU WFD implementation timeline were prepared for the first EU WFD cycle in the years 2009-2015. The second EU WFD cycle addressed the years 2016 to 2021; the third and ongoing cycle focuses on the years 2022 to 2027. Danube countries, which accessed the EU only after the year 2009 (like Croatia in the year 2013), or which are non-EU-Member States (such as BA, RS, MD, ME and UA), started the preparations of the RBMPs only at a later stage.

The DRBMP and DFRMP Update 2021 have been endorsed in the Danube Ministerial Meeting on 8 February 2022, during which Danube Ministers adopted the Danube Ministerial Declaration focusing on a "Vision for Integrated Water Management in Our Shared Basin: Building a Sustainable Future in the Danube River Basin" and calling for actions until the year 2027.

This Interim Report on the Implementation of the Joint Programme of Measures in the Danube River Basin, published three years after the adoption of the DRBMP Update 2021, reflects accomplishments and progress made together by Danube countries over the past three years, but also looking back at the adoption of the EU WFD more than 20 years ago. The report refers to measures related to surface water pollution and hydromorphological alterations, addresses groundwater pollution, describes monitoring activities and measures related to the effects of climate change, outlines the inter-sectoral cooperation and highlights sturgeon conservation activities. Additionally, it showcases the financing of the Joint Programme of Measures and explains public participation and active involvement of stakeholders in the Danube River Basin. Due to the work of the ICPDR and the progress in the implementation of the EU WFD and EU FD in Danube countries, the environmental situation in the Danube River Basin improved over the last years. However, also the aspect of gaps in the implementation of the EU WFD and remaining challenges are addressed in the Report.

On the **International Sava River Basin Commission (ISRBC)** level, within the 3rd EU WFD and RBM planning cycle, the preparation of the Interim Report on 2nd Sava RBMP Programme of Measures implementation is ongoing. Based on information provided by the Sava riparian countries, the Sava Interim report will contain information on level of implementation progress along with the types of measures implemented. Furthermore, lighthouse projects, initiatives, or best practices carried out in the Sava countries in relation to the measures implementation will be highlighted. The Sava Interim Report is planned to be confirmed by the ISRBC PEG RBM by the end of December 2024.

The success of the ICPDR is thanks to all of the Danube country delegations, Expert Groups, Task Groups, and the Permanent Secretariat – along with representatives from industry, the scientific community, and the public – all cooperating to ensure the sustainable and equitable use of water resources in the Danube River Basin.



## 2. PROGRESS IN THE IMPLEMENTATION OF THE JOINT PROGRAM OF MEASURES



### 2.1 CONTROLLING POLLUTION OF SURFACE WATERS: PROGRESSING BUT UNFINISHED BUSINESS

**In the first two management cycles of the WFD, Danube countries made significant investments, implemented a wide range of measures and substantially strengthened institutional and technical capacity in the field of pollution management, resulting in a considerable reduction of pollution and much cleaner surface waters than before.**

Pollution of surface waters by organic substances, nutrients and hazardous chemicals is still a significant pressure on aquatic ecosystems of the Danube River Basin (DRB). Pollution is the main pressure on two thirds of the total length of the DRB's surface waters that are at risk of failing to meet the WFD objectives by 2027. Moreover, pollution by plastics and chemicals of emerging concern are current challenges Danube countries are facing. Pollution may cause oxygen depletion, eutrophication, toxicity, ecosystem disruptions and habitat deterioration, therefore pollutant emissions at source should be prevented and contaminant transport towards and within surface water bodies should be carefully controlled.

Policies for pollution management build on three fundamental pillars. Appropriate monitoring systems have to be established to identify the problem. They should be accompanied with the development of a comprehensive emission inventory to determine the main pollution sources and pathways. Once the most problematic substances and their origin are known, appropriate strategies and measures should be put in place to prevent and control pollution, including regulatory tools, financial mechanisms and soft interventions such as capacity building and awareness raising.

Minimizing the release of pollutants into surface waters needs integrated, basin-wide strategies addressing both point source emissions and diffuse pollution pathways. These strategies should target all relevant sectors such as waste and wastewater management, agriculture and land management, industry and mining activities, transport and traffic as well as households and urban areas. Programs of measures to reduce pollution should follow the pollution management hierarchy. Measures to prevent and minimize pollution at source and along the main emission pathways should be prioritized, accompanied by transport control and remediation measures to retain pollutant flows and remove accumulated pollutants. In addition, the restoration of rivers and the reconnection of wetlands and floodplains can improve the retention capacity in the surface waters and further reduce the transport of pollutants.

### MEASURES IMPLEMENTED OVER THE LAST DECADES

Measure implementation was first intensified in the upstream Danube countries (Germany, Austria) in the 1990s when several EU sectoral policies to control emissions came into force, such as the Urban Wastewater Treatment Directive (UWWTD), the Integrated Pollution Prevention and Control Directive (IPPCD) and the Nitrates Directive (ND). The ambitious provisions of these Directives were further reinforced and even strengthened by the WFD after 2000, which recognized the importance of pollution control regarding the achievement of good water status by relating the chemical status to standards of selected priority substances and integrating pollution limits in the ecological status. In addition, EU directives concerning pollution control have been integrated into the Water Framework Directive by making them mandatory basic measures or linking them to the requirements of the Common Agricultural Policy (CAP). Key facts on measure implementation during the last two decades are highlighted in the Infobox below.

The ICPDR has substantially supported Danube countries in their efforts on strengthening capacity needed for developing an enabling policy framework at national level and improving technical knowledge towards effective pollution management strategies. The ICPDR developed thematic guidance documents and recommendation papers, co-organized capacity building workshops and provided technical tools such as databases and water quality models.

Furthermore, Danube countries have jointly taken important steps to close knowledge gaps on pollution sources by compiling basin-wide emission inventories, conducting targeted monitoring campaigns at urban wastewater treatment plants and developing inventories on accidental pollution hot-spots. Moreover, the ICPDR supported projects focused on modelling and managing nutrient and hazardous substances pollution, tackling macro- and microplastic pollution and strengthening the safety of tailings management facilities (TMF) in the DRB.





### IN THE LAST FIFTEEN YEARS, DANUBE COUNTRIES HAVE:

- invested ca €28 billion EUR in wastewater infrastructure;
- implemented more than 6,000 municipality projects and constructed or upgraded collecting and treatment facilities for around 45 million population equivalents (PE), out of which 1,700 municipalities and more than 35 million PE have been provided with treatment plants having nutrient removal technology;
- increased the percentage of municipalities connected to a sewer system and urban wastewater treatment plant or adequate individual treatment facilities to almost 80% at the DRB level;
- introduced targeted technologies at about 30 urban wastewater treatment plants (UWWTPs) to remove hazardous pollutants from wastewater;
- implemented specific disinfection technologies at more than 100 UWWTPs that are partly able to remove organic micropollutants;
- issued certification for updated technology standards almost at 180 operating industrial facilities with direct surface water emissions;
- implemented Nitrates Action Programmes with mandatory rules on manure and fertilizer application for more than 60% of the DRB;
- spent more than €95 billion EUR to support farmers and finance best management practices;
- increased the proportion of agricultural land (in EU MS across the DRB) determined for direct financial support linked to compliance with basic standards and provided with subsidies for environmentally-friendly measures to 70% and 20%, respectively.

In the Danube Declaration (2022), adopted at the ICPDR Ministerial Meeting on 8th February 2022, Danube Ministers reconfirmed that *“pollution of surface water bodies by organic materials, nutrients and hazardous substances is a significant pressure that needs to be further addressed at basin-wide level”* and emphasised that *“emerging issues such as pollution by plastics and chemicals of emerging concern are future challenges that Danube countries have to face”*. They recognised that *“Danube countries have made significant efforts and investments to implement a number of pollution control and safety measures”* and appreciated the *“transboundary cooperation and the outcomes of basin-wide projects and initiatives implemented on monitoring, controlling, and preventing surface water pollution”*.

Building on these achievements but also recognizing the future challenges, for the period 2022-2027 Danube Ministers committed to *“continue maintaining the existing measures and implementing additional necessary actions in the urban wastewater, industrial, mining, agricultural, waste management and other production sectors as appropriate, to prevent and further reduce surface water pollution”*. They also dedicated to implement the *“ICPDR policy recommendations at national level, as appropriate, in order to achieve an enabling regulatory framework for pollution control”* and to *“support maintaining and, if necessary, updating the pollution and accident hot-spot inventories and assessment tools as key technical instruments of the ICPDR for protecting water quality”*.



## • TRANSNATIONAL PROJECTS

### DANUBE HAZARD M<sup>3</sup>C PROJECT

Danube Hazard m<sup>3</sup>c built on three elements of water governance, namely measuring, modelling and management, complemented by capacity building. The project aimed in particular to improve the knowledge and understanding of the status quo of hazardous substances water pollution in the DRB, by integrating and harmonizing available existing data of hazardous substances concentration levels and by modelling emissions at catchment scale in pilot regions. Moreover, targeted measurement campaigns were carried out to fill critical gaps needed to provide a robust basis for modelling and management. A further goal was to enhance the transnational management of hazardous substances water pollution by basin-wide emission modelling, assessment of management scenarios and elaboration of policy recommendations along with a catalogue of measures. Capacity building was also a key feature of the project by providing tailor-made training activities and developing a technical guidance manual.

[\*Link to the project results\*](#)

### DANUBE TMF PROJECT

The project aimed at contributing to narrow the knowledge gaps and to raise awareness on TMFs and their hazards in the DRB, ensuring to respect a common set of minimum standards and safety requirements in the DRB and strengthening the technical and management capacity at the concerned facilities and responsible authorities. Building on a previously developed assessment methodology, practical tools were elaborated and adapted to the DRB conditions to consistently assess the hazard and risk of TMFs located in the DRB and to evaluate their safety and recommend measures to improve safety conditions. Moreover, within the project a demonstration regional training event was organised at Baia Mare in Romania to deepen the knowledge of invited TMF operators, environmental inspectors and competent authority experts on TMF management and to fine-tune the methodology based on field experiences. Competent authorities, TMF operators, concerned stakeholders and the public in the DRB are encouraged to apply these tools, which are intended to contribute towards limiting the number of accidents at TMFs and minimising the severity of their consequences for human health and the environment.

[\*Link to the project results\*](#)

### TID(Y)UP PROJECT

A significant step towards managing plastic pollution in the Tisza Basin was taken with the implementation of the Tid(y)Up Project, funded by the Danube Transnational Programme and supported by the ICPDR. The project's key outcomes were warmly welcomed by the ICPDR as they provided valuable tools to help Danube countries overcome the plastic challenge. The project delivered important technical advancements, including harmonized microplastic monitoring methods and an online hot-spot map that shows major plastic accumulation sites along and in the Tisza River and its main tributaries. Additionally, a professional clean-up activity was launched in cooperation with the Hungarian water authorities, complemented by numerous voluntary, community-led actions undertaken by concerned citizens. Furthermore, the project produced valuable dissemination and awareness-raising materials, including policy recommendations, a clean-up handbook, a floating exhibition, and a waste reduction toolkit.

[\*Link to the project results\*](#)



## • BASIN-WIDE INITIATIVES

### UWWTP INFLOW AND EFFLUENT MONITORING IN THE FRAMEWORK OF JDS4

The JDS4 investigated the potential removal rates of 11 UWWTPs for 20 indicator substances. Six out of the 20 indicator substances showed high average removal rates (> 80%). Medium removal rates (27-75%) were observed for eight substances, whereas poor elimination (<5%) or even negative removal rates were observed for six substances. In total, 8 out of the 20 indicator contaminants were eliminated with a removal rate below 50%. Moreover, samples were analysed by in vitro bioassays. The effect-based analyses indicated that the currently used wastewater treatment technologies in the DRB are unable to remove efficiently groups of chemicals of emerging concern causing specific adverse effects like estrogenicity, enzymatic activity, xenobiotic metabolism and oxidative stress.

[Link to JDS4 results](#)

### WASTEWATER INITIATIVE

Building upon previous activities on wastewater management by the World Bank under the Danube Water Program and ICPDR, the aim of the initiative is to provide regional knowledge exchange opportunities on topics relevant to the national wastewater management sectors and implications for necessary actions to reach UWWTD compliance. Although different international and regional wastewater programs are already in place, there is still a need and space for a targeted activity on regional level that would focus on those aspects of wastewater management, which are very important but were left out of focus up to now. There is a particular need for a targeted wastewater management activity on regional level, focusing on: a) financial sustainability of wastewater management (present and future), b) rural and small-scale wastewater management, c) circular economy aspects and d) emerging contaminants.

### SUSTAINABLE AGRICULTURE

Danube countries initiated a dialogue with the agricultural sector and developed the Guidance Document on Sustainable Agriculture. The guidance paper recommends sound policy instruments, financial programs and cost-effective agricultural measures to protect water bodies for decision makers in the agri-environmental policy field. It offers Danube countries support for the preparation and implementation of their tailor-made national agri-environmental policies, CAP Strategic Plans and relevant strategies of the River Basin Management Plans in good synergy. The recommendations provide the Danube countries with a framework to adjust their national agri-environmental policies. They on one hand give specific advice on how to implement more efficiently existing legislation and on the other hand help countries to better identify, target and finance additional measures going beyond legal obligations. Thus, the guidance should act as a strategic policy framework providing consistent approaches into which the Danube states are encouraged to integrate their individual national methods. It lays down the basis for designing cost-effective, targeted national measures according to national needs and conditions taking into account that no "one size fits all" standardisation could work in the DRB.

[Link to ICPDR activities on sustainable agriculture](#)



## • NATIONAL EXAMPLES

### CURRENT DEVELOPMENTS OF URBAN WASTEWATER SECTOR IN CZECHIA

In the Czech Republic most of the measures are focused on the reconstruction and completion of sewer systems in small agglomerations or peripheral parts of larger cities. A number of small wastewater treatment plants install nutrients removal equipment (intensification). In some cases, additional stages of purification are installed, such as Ultraviolet (UV) radiation to reduce bacterial pollution or biological ponds.

One of the current measures is the intensification of the existing Tetcice Municipal Wastewater Treatment plant with an increase in its capacity from 13,060 PE to 22,500 PE. The new construction will ensure wastewater treatment from the town of Rosice, the municipalities of Zastavka, Ostrovacice, Ricany, Babice, Tetcice, Kratochvilka and Neslovic. Part of the treated wastewater will be further disinfected by UV radiation and reused as a source of water in the dry season or as a subsidy of water for a wetland biotope. The estimated cost of the construction is about 1 million EUR with completion in 2025.

### ELIMINATION OF TRACE SUBSTANCES AT MUNICIPAL WASTEWATER TREATMENT PLANTS BY QUATERNARY TREATMENT IN BAVARIA, GERMANY

To improve the overall efficiency for trace substance removal, a fourth purification step (quaternary treatment) is to be established at strategically selected treatment plants. To assess the potential treatment options, a systematic step-by-step approach was developed:

- 1) The pollution situation of Bavarian waters was systematically analysed for 12 selected trace substances. Diclofenac, which is used for pain and inflammation therapy, has emerged as the essential lead substance.
- 2) Treatment with ozone combined with sand filters and granulated activated carbon filters, respectively, was proved to be the most efficient technology option.
- 3) Accordingly, this technology was installed at the Weißenburg sewage treatment plant as a quaternary treatment unit. It has been successfully working since October 2017.
- 4) Bavaria has actively participated in the dialogue process for the national German trace substances strategy started in 2016. Within this strategy, ca. 90 plants are included in a Bavaria-wide programme of measures. Currently, a funding programme is offering grants for 13 high priority plants, covering up to 70 % of the respective investment costs.

### WASTEWATER MANAGEMENT OF THE CITY OF LESKOVAC, SERBIA

The wastewater treatment plant in Leskovac with a capacity of 86,000 PE is located near the village of Bogojevce in the area, where the River Veternica flows into South Morava. This project, worth over 24 million Euro, will significantly contribute to the protection of very rich hydrographic network of rivers, lakes and groundwater in this area, and help to restore the wild beauty of South Morava, which in recent times received the nickname "Sad Morava" due to the pollution of the river. The spas with thermal mineral water make this area an important tourist spot as well. Main purpose of the project is the completion of UWWTP Leskovac.

The construction of the first phase was financed from EU IPA funds with 10.4 million Euro, and the second phase was financed by the Ministry of Environmental Protection in the amount of 4.8 million Euro. Phase II consists of anaerobic digestion of sludge, production of biogas and production of electricity from biogas as an alternative source of energy. The Republic of Serbia approved an additional 326,000 EUR for the release of the water line, which created the conditions for the trial run of the sludge line, which is now finished and the biogas is being produced from the sludge. The Republic of Serbia financed the city collector for the delivery of wastewater in the length of 5 km in the amount of 4.1 million Euro. It was completed in 2021. The expansion of the sewage network in the length of 90 km is underway, financed by the Kingdom of the Netherlands in the amount of 8 million Euro. The end of construction works is expected in May 2025, then the UWWTP will reach the full mode of operation, which is now operating at a partial capacity of the designed capacity. Implementation of the project ensures that the wastewater management is in line with the requirements of relevant EU legislation and national legal acts.

## • NATIONAL EXAMPLES

### NATIONAL PLAN FOR RECOVERY AND RESILIENCE IN ROMANIA (2022-2026)

One of components of the National Plan for Recovery and Resilience is C1 – Water Management, with the aim to ensure sustainable water provision for a safe future for people, the environment and the economy. In particular, the component aims to increase public access, especially in rural areas, to public water and sanitation services in line with the requirements of the relevant EU legislation and make it accessible to all social groups.

Investments are planned for 3 types of measures in human agglomerations:

- extension of water and sewerage systems in agglomerations of more than 2,000 PE; a total of 1,600 km of water distribution networks and at least 2,500 km of sewage network shall be built and made operational (total 780 million EUR);
- collection of wastewater in agglomerations with less than 2000 PE; at least 12,900 individual adequate systems or other appropriate systems and at least 400 km of sewage network shall be built and made operational (total 221 million EUR);
- support the connection of the low-income population to the existing water supply and sewerage networks; at least 88,400 additional households shall be connected to water and sewerage (total 168 million EUR).

[Link to more information](#)

### WATER AND SANITATION SERVICES MODERNIZATION PROJECT IN BOSNIA AND HERZEGOVINA

The objective of the Water and Sanitation Services Modernization Project for Bosnia and Herzegovina (BiH) is to support BiH to: (i) strengthen the institutional capacity at the Republika Srpska (RS), Federation of BiH (FBiH), and local level for improved water supply and sanitation (WSS) service delivery, (ii) improve access to safely managed WSS services, and (iii) improve the efficiency of WSS service providers in participating local governments. The project with a budget of 67.90 million USD comprises of three components. The first component, improving the institutional capacity for sector modernization will finance activities at the entity level to strengthen policy and regulatory frameworks and institutional capacity to advance sector reform and promote sustainable service delivery. It consists of following sub-components: (i) supporting water supply and sewerage sector reforms at entity level; and (ii) project management and coordination of the sector reforms. The second component, supporting improved governance and capacity of the water services sector at the local level targets the strengthening of the local WSS service delivery framework and its alignments with the institutional and regulatory framework that will be set at entity level to maximize the impact of the reform process. The third component, improving access to safely managed WSS services and the efficiency of WSS service providers will finance investments according to the water utilities' performance level classification and the needs identified in their business plans prepared under the second component.



## • NATIONAL EXAMPLES

### MODERNIZATION OF INDUSTRIAL WASTEWATER TREATMENT IN SLOVAKIA

Mondi SCP Ružomberok is one of the most significant pulp and paper industrial facilities in Slovakia. In 2022, Mondi invested in a new anaerobic wastewater pre-treatment plant at its pulp and paper mill in Ružomberok. Anaerobic wastewater treatment is a solution for treating higher amounts of organic residues that can be found in industrial raw wastewater. It also delivers valuable biogas, which is used for energy generation. Excess anaerobic bio sludge is transformed into anaerobic pellets, which are sold as secondary raw materials.

[\*Link to more information\*](#)

### IMPLEMENTATION OF THE EU INDUSTRIAL EMISSIONS DIRECTIVE (IED) IN SERBIA

The project IED Serbia “Green Transition – Implementing Industrial Emissions Directive in Serbia 2021-2025”, represents the third phase of cooperation between the Ministry of Environmental Protection, Cleaner Production Centre of the Faculty of Technology and Metallurgy, University of Belgrade, and the Swedish International Development Cooperation Agency. The project promotes the transition of Serbian industry to green technologies by supporting the implementation of national regulations in the area of integrated pollution prevention and control. The main objective of the project is to provide assistance and support to competent authorities and companies in the implementation of the Directive, which would reduce the impact of industrial emissions on the environment and human health.

The project will provide technical and administrative support to the Ministry of Environmental Protection and other competent authorities regarding various activities, such as the preparation of draft integrated permits for the selected companies, completion of the Directive-specific Implementation Plan (DSIP) for the IED, amending and preparing the regulations and certain parts of the Negotiation Position in the field of industrial pollution and dissemination of information on the IED and the project activities. As part of the project, a Code of Business Conduct was created that establishes general rules of business conduct for all employees of the project. The goal of the Code is to contribute to the execution of business activities in the spirit of business ethics, good business practices, and the principles of good faith, as well as to improve the transparency of business operations.

[\*Link to more information\*](#)

### WATER-SENSITIVE URBAN DEVELOPMENT IN GERMANY

The city of Neu-Ulm (Bavaria) is planning a residential area with an innovative rainwater management and heavy rain prevention that will be exemplary for climate-resilient settlements. In the new urban quarter with 600 residential units, the rainwater is to be drained off via a central green area and infiltrated on the site. This “green space” is a design element and also a recreation and playing area in dry weather. Public drainage areas are directed to infiltration via paved linear drainage. Private areas are drained via transport pipes. All roof surfaces are designed as green roofs and can absorb considerable amounts of the precipitation. Traffic areas contaminated with road salt are infiltrated decentrally and in places where trees and shrubs cannot be damaged.

[\*Link to more information\*](#)

## • NATIONAL EXAMPLES

### **BODEN:STÄNDIG – PLATFORM FOR SOIL AND WATER PROTECTION IN BAVARIA, GERMANY**

boden:ständig is a platform coordinated by the Bavarian Rural Development Administration. Farmers and municipalities in more than 100 projects areas across Bavaria are currently engaged. In a boden:ständig project, people are involved who are themselves working on site to solve a specific problem. The problems may be local flooding after heavy rainfall, erosion, nutrient inputs into lakes or water shortages caused by extreme droughts.

The potential measures belong to three fields of actions:

- Technical production measures e. g. no-plough cultivation, mulch sowing with single tillage or crop rotation;
- Landscaping measures e. g. path networks with delayed water run-off, retention basins or buffer strips along waters;
- Water-related measures e. g. restoration of waters or floodplains.

[Link to more information](#)

### **SUPPORTING ADVICE UNDER THE CAP STRATEGIC PLAN 2023-2027 IN CZECHIA**

Support for advice is aimed at providing individual counselling service through certified counselling bodies. The main objective of this certification is to ensure the comprehensiveness of the advice and an increase in the quality of the service provided by the advisory bodies. These advisory bodies include both accredited advisers and experts in all areas of farming.

The beneficiary of the subsidy is a natural or legal person who is a consultancy body certified by the Institute of Agricultural Economics and Information (IAEI). The farmer is the final user of the advisory service. The maximum amount of subsidy per advisory service/per farm is about 2,000 EUR. The subsidy rate is 80 % of the expenditure on which the subsidy is based. The remaining 20 % of the costs will be borne by the farmer.

In addition to these aids, advisory and methodical assistance to farmers is also supported at the national level by:

- Regional transfer of information to small and medium-sized enterprises (SMEs) through personal, telephone and email consultations. The beneficiaries of the subsidy are agrarian non-governmental organizations (NGOs).
- Expert consultations for agricultural and forestry consultancy. Applicants for subsidies are sector-oriented research institutes and universities.

### **EXPERIMENTAL RESEARCH PROJECT TO REDUCE NITRATE LEACHING IN HUNGARY**

On behalf of the Ministry of Agriculture, one of the research tasks of the Institute for Soil Sciences and Agricultural Chemistry of the Centre for Agricultural Research (ATK TAKI) in 2020 was the revision of the maximum applicable nitrogen doses that can be applied under certain field crops, specified in Annex 3 of the Hungarian Nitrate Decree (FVM Decree 59/2008. (IV. 29.)). Based on the results of small plot-scale experiments accomplished in previous years, farm-scale experiments were set up in selected agricultural holdings. The purpose of the experiments was to raise the maximum applicable nitrogen dose values rationally, in order to ensure that they are in line with the crops' real nitrogen demand, even when high yields are achieved, while reducing the level of ammonia-emissions and the risk of nitrate leaching.

Nutrient balances in the corn, winter wheat, and sunflower experiments set up on a large number of fields were unanimously negative, in each treatment the plants' nitrogen uptake was higher than the nitrogen inputs. The situation is similar for the other plants in the majority of the pilot fields. Based on the results it can be concluded that the plants utilized the increased amount of nutrients and no over-fertilization occurred with the application of higher maximum applicable nitrogen values, provided that the crops are grown under good agricultural conditions.

Based on the experiments, researchers argue that the nitrogen amount added to the soil should be close to the amount that is absorbed by the plants, i.e. the permitted maximum applicable nitrogen values should be increased. Professionally well-supported proposals regarding the extent of the modifications can be developed based on the experience of additional experimental years.



# BEST CASE EXAMPLES

## • NATIONAL EXAMPLES

### AGRICULTURAL COOPERATIVE IN KRAKOVANY, SLOVAKIA

Most farmers in Slovakia approach the land in the classic conventional way, i.e. they intensively grow a few crops, constantly mechanically stress the soil by ploughing and subsequently use artificial fertilizers and other chemicals on a large scale. In Krakovany, they do it differently. They give the soil as much peace as possible and interfere with it minimally – they do not use ploughing. Professionally, this is called regenerative management.

Thanks to this approach the soil is not degraded by ploughing and heavy machinery. It is no longer an arid brown or even grey matter to which chemical fertilizers need to be added and on which excess runoff is formed when raining, subsequently washing away the most fertile part of the soil. The regenerative approach results in fields being able to retain water and not generating high runoff and erosion rates even in case of heavy rains. Another important condition for the health of the fields is that the ground does not remain bare and uncovered. Catch crops should be sown and harvest residues should be left on the ground.

Traditional farmers fear that with this different approach their yields and profits would decrease. However, more than ten years of local experience proves the opposite. In general, expert studies say that in the first years the harvest falls by 10 to 20 percent. On the other hand, a lot of money is saved on fertilizers, chemical treatments or machinery fuel. Ultimately, lower returns will be offset by lower input costs.

[Link to more information](#)

### CLEANING UP MACROPLASTIC ACCUMULATION HOT-SPOTS IN HUNGARY

Macroplastic pollution is a persistent issue in several sub-basins of the DRB. Notably, observations of the Upper Tisza Basin and recently of the Drina catchment area have shown that severe plastic pollution occurs periodically during flood events, originating from litter illegally dumped in floodplains.

The Plastic Cup initiative, initiated in Hungary in response, has attracted considerable public attention. This community-driven, bottom-up, non-governmental and non-profit initiative aims to raise awareness and contribute to the clean-up of the Upper Tisza River. The Plastic Cup initiative brings together local residents, environmentalists, artists, volunteers, companies, students, families and friends in a shared mission to protect the aquatic environment, while enjoying the beauty of riverside nature.

Plastic Cup activities include hot-spot identification, coordinated waste removal campaigns, plastic vessel competitions, recycling, awareness raising events and team building programmes. These voluntary actions are now backed up with professional clean ups carried out by the water authorities mainly at major accumulation points such as hydropower dams. The combination of these two clean-up efforts has a great success and impressive numbers, several hundreds of sites have been cleaned up, recently hundreds of tons of plastics are removed each year, with growing annual amounts. Importantly, 60% of the collected plastic waste are recycled.

[Link to more information](#)

### REMEDICATION OF THE GREAT BAČKA CHANNEL IN SERBIA

Intensive development of economy in the second half of 20th century in Vrbas, Kula and Crvenka caused increased production of industrial as well as urban wastewaters. Because of inadequate treatment of industrial wastewater, the 6 km long section of Great Bačka Channel downstream of the lock in Vrbas, was declared as one of the most polluted watercourses in Europe. More than 400.000 m<sup>3</sup> of sediment in the channel is loaded with heavy metals (Cr, Ni, As, Pb, Cd), nutrients and pathogenic bacteria. Based on estimated source appointment of nutrient pollution, 70% of pollution was coming from industrial, 20% from municipal and 10% from agricultural sources. The contaminated sediment and polluted water are not only a problem for the channel but also for the Tisa and Danube Rivers since pollution moves downstream. Moreover, the channel became too shallow for navigation and poses huge health and ecological risk not only to local population but to the economy and future development of the region.

Since 1990's, a number of activities has been initiated regarding the recovery and remediation of the channel, such as several studies on water and sediment quality, toxicological analyses of the sediment, as well as activities on development and completion of sewage collectors and systems, resolving industrial pollution, etc. In 2007, the Protocol on Cooperation on Implementation of the Project "Final solution of pollution and remediation of the Great Bačka Channel" was signed by all relevant stakeholders in Serbia. The project has been conducted through 4 phases focusing on construction of wastewater facilities in the region (main collector, sewage network, central UWWTP) and remediation of the channel (removal and remediation of the polluted sediment). While the wastewater investments have already completed, the remediation of Great Bačka Channel, which will finally give the result that is waiting for decades, is still on-going.

[Link to more information](#)

## 2.2 HYDROMORPHOLOGY IN THE SPOTLIGHT OF WATER MANAGEMENT

**In the first two management cycles of the WFD, Danube countries made significant efforts in implementing measures to improve ecosystems, encourage climate change mitigation, provide sustainable flood protection, fight the impacts of droughts and ensure attractive space for people.**

Hydromorphological conditions play an important role in the functioning of aquatic ecosystems and are therefore important elements with regards to the water status in the Danube River Basin.

The EU Water Framework Directive has put a spotlight on hydromorphology representing an integrative role for improving the ecological status, focusing on biodiversity and ecological connectivity, for providing a better flood protection by directing towards nature-based solutions and green measures, for fighting the impacts of droughts by contributing to minimize the effects of climate change and for ensuring attractive space for people.

With the EU Biodiversity Strategy for 2030 and the concept of “free-flowing rivers” achieved by the removal of barriers and the restoration of floodplains and wetlands, the utmost importance to integrate hydromorphology from the very beginning in the spatial planning process has been prominently highlighted.

Over centuries, human activities and constructions have led to fundamental changes in the physical structure and appearance of rivers, lakes, and coastal waters. Along the course of the Danube River and its tributaries, natural habitats have been substantially decreased which is reflected in deteriorated water status and significantly reduced biodiversity. Migration routes for fish species have been blocked by diverse barriers.

More than half of the water bodies in the Danube River Basin are under (at least one) significant hydromorphological pressure. Hydromorphological alterations in the Danube River Basin are mainly caused by flood protection measures, hydropower, navigation, agriculture and water supply. In some cases, development schemes that are causing hydromorphological alterations serve to multiple purposes. The following three key hydromorphological alterations of basin-wide importance have been identified to be addressed in order to ensure for a healthy river system:

- Hydrological alterations (impoundments, water abstractions, hydropeaking),
- Interruptions of longitudinal river continuity and sediment balance alterations (such as dams and weirs),
- River morphological alterations (such as river straightening and bank enforcement) and disconnection of wetlands/floodplains.

A natural or near-natural hydrological regime, river continuity and morphological conditions are a prerequisite for developing and maintaining freshwater habitats, aquatic ecosystems and biodiversity. Within the hydrological regime it is important to preserve the quantity and dynamics of water flow and its connection to groundwater bodies. Related to river continuity it is important to enable migration for aquatic organisms and transport of sediments. As for the morphological conditions, it is crucial to preserve the river depth and width variation, structure and substrate of riverbed as well as the structure of the riparian zone and connection between channel and floodplains/wetlands. Natural or near-natural hydromorphological conditions are not important only in relation to habitats, but also for the reduction of nutrients, adaptation to climate change and water scarcity as well as for droughts prevention.

The increasing effects of climate change and the occurrence of more extreme hydrological events such as floods and droughts show that there is a strong need to make rivers as ecosystems more resilient. The implementation of the concept to give more “space to rivers” is recognized as one of the most important recommendations for addressing water scarcity and achieving common synergies and benefits between the objectives of the EU Water Framework Directive and EU Floods Directive, at the same time contributing to the objectives of the EU Strategy on Adaptation to Climate Change.

**Numerous hydromorphological measures have been implemented in the Danube River Basin in the period between 2009 and 2021. The main aim of those measures was the mitigation of hydrological alterations like water abstractions, impoundments and hydropeaking, improvement of river continuity (building of fish passes or dam removal), reconnection of wetlands/floodplains and improvement of morphological conditions (river restoration projects).**

- 66 implemented measures were related to the improvement of hydrological alterations, mainly to water abstractions and impoundments. As of the year 2021, additional 5 measures addressing hydrological alterations are in the construction phase.
- 127 fish migration aids were completed; as for 8 fish migration aids the construction is on-going as of the end of 2021. Furthermore, numerous fish migration aids and river restoration projects are currently in the planning phase.
- 58 river restoration projects have been implemented, while additional 21 river restoration projects are in the construction phase as of the year 2021.
- There were also 61,745 ha of wetlands/floodplains partly or totally reconnected; for additional 4,526 ha the construction of reconnection is still ongoing as of the end of 2021.

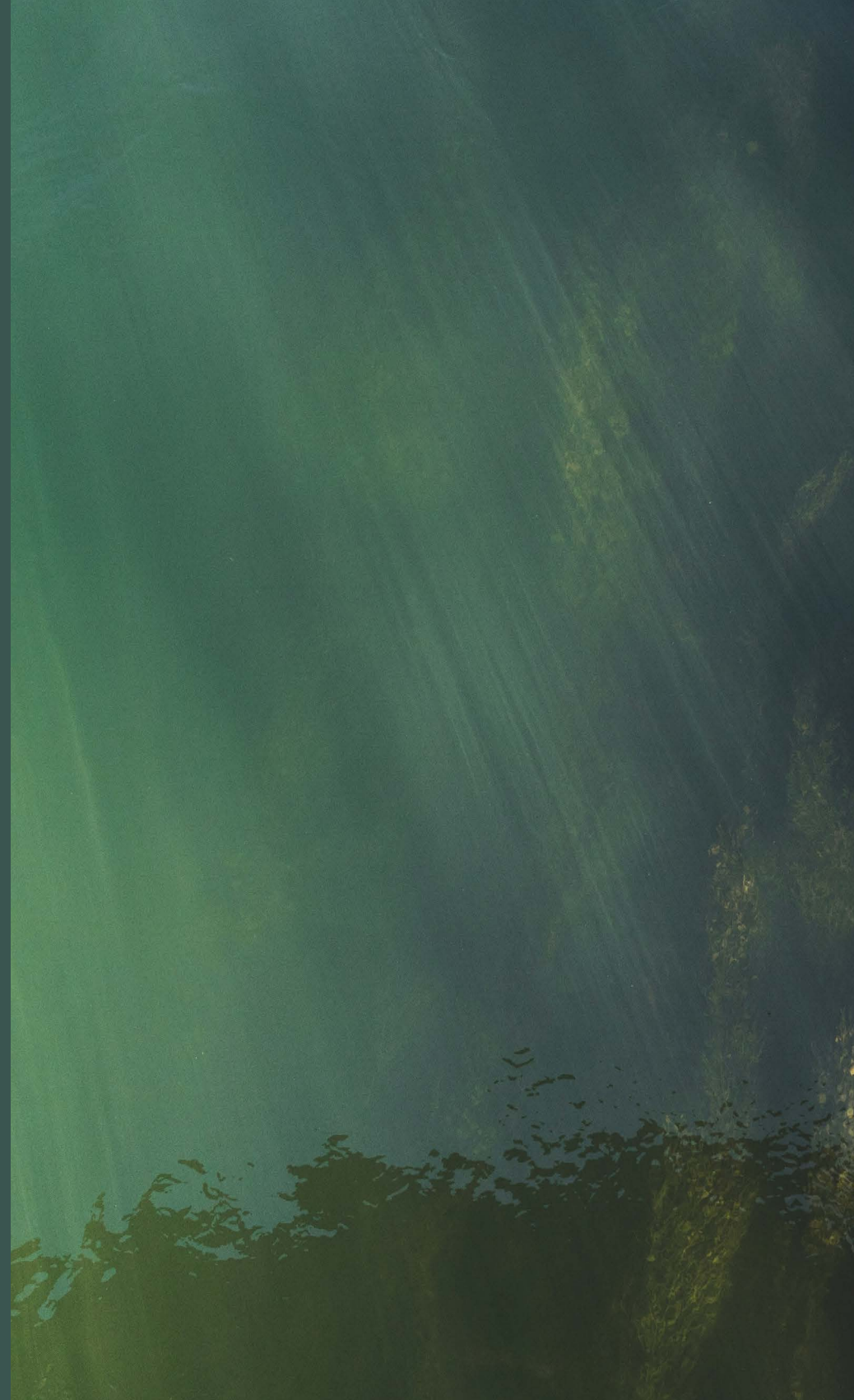


While within the DRBMP only measures on rivers with a catchment area larger than 4,000 km<sup>2</sup> are presented, it is important to emphasize that Danube countries are implementing hydromorphological measures also on other (smaller) rivers, where diverse hydromorphological pressures were assessed.

In the Danube Declaration (2022), adopted at the ICPDR Ministerial Meeting on 8th February 2022, Danube Ministers referred to **“hydromorphological alterations of freshwater ecosystems in the Danube River Basin from flood protection infrastructure, hydropower, navigation, agriculture, and water supply”** and welcomed **“main achievements in addressing pressures from hydromorphological alterations, making the Danube River Basin’s water healthier through numerous hydromorphological measures already implemented to improve hydromorphological conditions in the period 2009-2021”**.

In the Danube River Basin Management Plan Update 2021, Danube countries reported additional measures addressing hydromorphological alterations for the period 2021 to 2027. 204 measures are related to improvements of impoundments, 46 to water abstractions, 32 to hydropeaking, 424 to continuity interruptions and 222 related to water bodies affected by morphological alterations. There is also foreseen that additional 23,399 ha of floodplains/wetlands will be reconnected by the year 2027.

As for the necessary actions to be undertaken in the years 2022 to 2027, Danube Ministers **“support additional measures planned for the period 2022-2027 by encouraging the upgrade of databases on hydromorphological alterations and the improvement of methodologies for hydromorphological pressures assessments”** as well as the **“implementation of restoration, protection and mitigation measures for habitats, river continuity and transboundary ecological migration corridors and in general the improvement of hydromorphological conditions by highlighting the importance of further synergies between flood and drought mitigation measures, nature conservation and hydromorphological measures (implementation of non-structural measures, e. g. floodplain preservation and restoration) and monitoring of measure effectiveness.”**



# BEST CASE EXAMPLES

## INTERRUPTIONS OF LONGITUDINAL RIVER CONTINUITY AND SEDIMENT BALANCE ALTERATIONS

### • TRANSNATIONAL PROJECTS

#### WE PASS 2 PROJECT

In March 2021, the European Commission (DG ENV) commissioned the 'Pilot Project: Making the Iron Gate Dams passable for Danube Sturgeon' (acronym WePass2) to conduct a feasibility study analysing the options to establish fish migration at the Iron Gate that includes (a) the study of alternatives for up- and downstream fish passage restoration at both Iron Gate dams, (b) a preliminary design of fish passes comprising all their technical elements, and (c) a cost estimate for the construction of the fish passes. The WePass2 project will be finalised in September 2024. The Iron Gate Hydropower and Navigation System is one of the largest river engineering projects undertaken in Europe, with the dams mainly built to provide hydropower and flood protection, and to facilitate navigation along the Danube. These infrastructures introduced barriers to fish migration. Hence, ensuring passage opportunities for fish at the Iron Gate dams is considered to be of major importance for the conservation of migratory fish populations in the Danube River basin. Restoration of river continuity at these sites would reopen an additional 900 km for migration up to the Gabčíkovo dam, providing suitable habitats and spawning grounds along the Danube and its tributaries.

#### SCUTE PROJECT

In December 2022 the European Commission, DG ENV, contracted (ENV/2022/OP/0019) a consortium of sturgeon experts (SCUTE) across Europe to advance the implementation of the Pan European Sturgeon Action Plan (PANEUAP) and to develop best practice guidelines on sturgeon population and habitat monitoring, on ex situ breeding and release measures and a study on sturgeon bycatch. Building on the example of the MEASURES project for the Danube, existing knowledge about sturgeon habitats and migration obstacles is being compiled in 11 key river basins including Danube, Rioni, Po, Vistula, Oder, Nemunas, Gauja, Narva, Elbe, Rhine and Gironde. For the Danube this leads to an updated version of the maps previously produced under the MEASURES project, depicting knowledge about historic, potential and confirmed habitat types, as well as existing barriers, protected areas and future planned infrastructure projects. The results of the mapping exercise will be released in the second half of 2024 with regional reports including the assessment of the state of implementation of 10 Danube countries towards the PANEUAP.

#### DANUBE4ALL

is an EU 'Lighthouse Initiative' in support of Mission "Restore our ocean and waters by 2030". This 5-year, Horizon Europe funded project aims to restore freshwater ecosystems in the Danube River Basin through the development of a comprehensive, scientifically-based and practically-orientated Restoration Action Plan. The project seeks to address the lack of knowledge, awareness, and participation of local people and business actors in the implementation of freshwater ecosystem restoration. The evaluation, joint development and implementation of Win2-NbS opportunities and solutions for the Danube basin will be implemented through research and analysis at three selected demonstration sites.

Further information is available on the website:

<https://www.danube4allproject.eu/>

#### DANUBE SEDIMENT PROJECTS

Based on the results of the EU-funded Interreg DTP project **DanubeSediment**, the ICPDR Heads of Delegations identified the alteration of the sediment balance as a sub-item under the SWMI "Hydromorphological alterations" in the DRBMP Update 2021. As this and the **SIMONA** project also highlighted many open issues, challenges and needs, a follow-up project on sediments was initiated that include both sediment quantity and quality. The main objective of the project **DanubeSediment\_Q2** (funded by the EU via Interreg DRP) is to improve the management of sediment quantity and quality in the Danube River Basin to support ecological conditions by developing pilot measures and an integrated sediment management plan for the DRB.



# BEST CASE EXAMPLES

## RIVER MORPHOLOGICAL ALTERATIONS AND DISCONNECTION OF WETLANDS/FLOODPLAINS

### • NATIONAL EXAMPLES

#### LIFE IRIS AUSTRIA

LIFE IRIS – Integrated River Solutions Austria. The Austrian Integrated LIFE Project IRIS supports the national implementation of both the Water Framework Directive (WFD) and the Floods Directive (FD). By applying a catchment-based, integrated planning approach, IRIS seeks to replace conventional water management strategies with more sustainable practices. IRIS is developing and testing an integrated planning tool (the River Development and Risk Management Concept) in 7 Austrian pilot rivers. To enhance both flood protection and the ecological status of Austrian rivers the tool applies a cross-sectoral and interdisciplinary planning approach at the catchment level, while involving various stakeholders and the public. The result of the planning process is a coordinated programme of measures for the whole river, defining the necessary actions to achieve the objectives of WFD and FD. Special attention is given to exploring nature-based solutions for flood protection and securing land for future river development. By defining river corridors where lateral barriers may be removed in the future the tool helps to identify potential free-flowing river stretches. The River Development and Risk Management Concept will be an impactful tool in future Austrian river management as it is to become an integral part of national water policy and a mandatory requirement for public funding of flood protection measures. Following the planning processes, integrative restoration measures for the improvement of river ecology and flood protection are implemented in the IRIS pilot rivers. New monitoring methods to assess the local impact of integrative measures regarding ecology, morphology, flood protection and selected ecosystem services were developed and first-time implemented for the IRIS pilot measures. LIFE IRIS in short: 9 years: 2018 to 2027, 16.5 million EUR: including 9.9 million EUR EU LIFE funding, 7 pilot river catchments: combining ecological objectives with flood risk management, Project website:

<https://life-iris.at/en/>

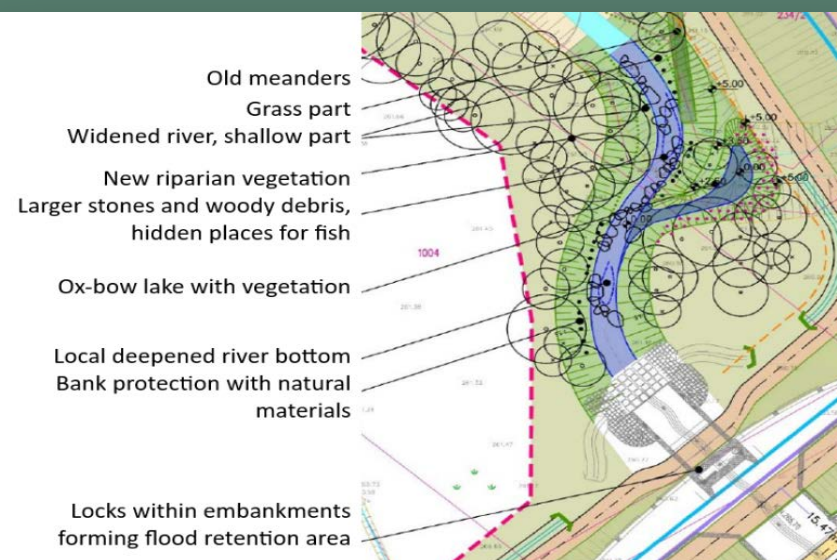


Picture: IRIS measure. Before and after. Enns River.

### ASSESSMENT OF FLOOD PROTECTION PROJECT ACCORDING TO NBS IMPLEMENTATION IN SLOVENIA (SI)

Within Slovenian Recovery and Resilience Plan (RRF) there are also flood protection projects included, which need to consider DNSH (“do no significant harm”) and NBS (“nature-based solution”) principle. For NBS principle new approach for assessment of flood project was developed, including different criteria that need to be considered. Based on flood protection project description and analysis of different measures within project, for every project “NBS contribution” is calculated. There are 4 criteria for NBS contribution analysed: Criteria 1 – Protection of flood retention areas, Criteria 2 – Widening of river corridor and river revitalisation, Criteria 3 – Implementation of mitigation measures within project area and Criteria 4 – Implementation of compensation measures outside of the project area. For every project NBS points for all criteria are calculated and final score is divided to 5 NBS classes – from very small to very large contribution. NBS contribution is also one of the final criteria for final selection of flood protection projects within RRF Plan.

[Link to the project results](#)



Assessment of NBS contribution for flood protection project “Flood retention area with NBS solutions on the Pešnica River”

- Criteria 1**  
Protection of flood retention areas (0 – 5 points\*): 3 points
- Criteria 2**  
Widening of river corridor and river revitalisation (0-15 points\*): 5 points
- Criteria 3**  
Implementation of mitigation measures within project area (0-5 points\*): 5 points
- Criteria 4**  
Implementation of compensation measures outside of the project area (0-3 points\*): 0 points
- Final score:** 13 points, medium NBS contribution

\*more detailed criteria for particular points are defined

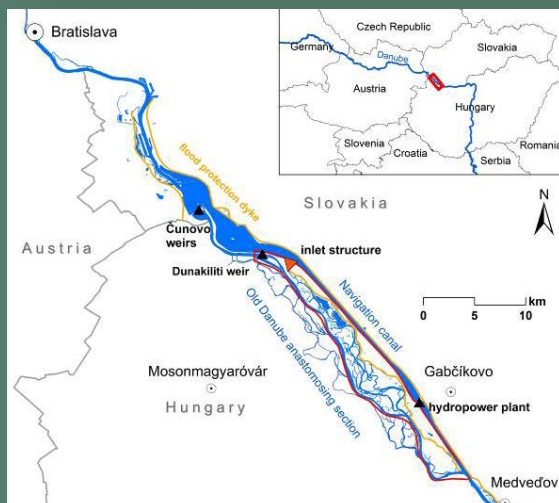
Picture: Nature-based solutions within flood retention area surrounded by embankments

# BEST CASE EXAMPLES

## RIVER MORPHOLOGICAL ALTERATIONS AND DISCONNECTION OF WETLANDS/FLOODPLAINS

### • NATIONAL EXAMPLES

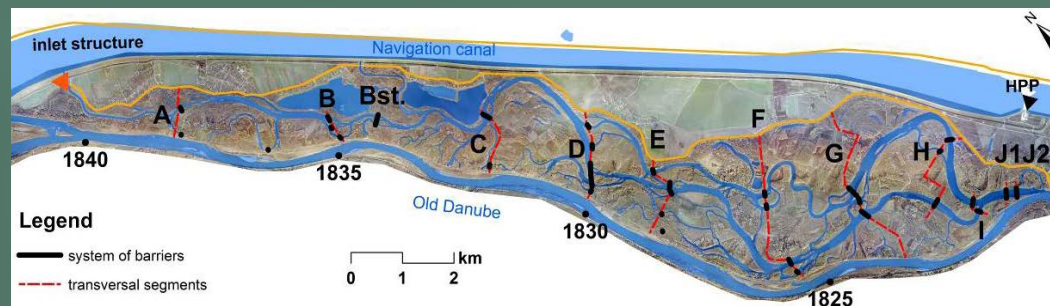
#### EXAMPLE OF MEASURES TO IMPROVE ALTERED WATER REGIME, LATERAL CONNECTIVITY AND LONGITUDINAL CONTINUITY IN THE DANUBE FLOODPLAINS IN SLOVAKIA



The former inland delta on the border between Slovakia and Hungary has been altered by the regulation of the Danube for hydropower, flood protection and navigation. After the construction of the Gabčíkovo HPP, the entire floodplain remained cut off from the Danube. Flow regulation in the channel (Čunovo weir), together with external factors such as climate change, also means that the lost interaction between the channel and the floodplain causes water scarcity in the entire sidearm system.

**Picture 1:** Area of interest between Dunakiliti and Medvedov, VÚVH

**Picture 2:** Slovak part of the Danube floodplain area divided by a series of barriers on side-arms (weirs, culverts, fords etc.), marked by black lines. The red lines indicate higher terrain that separates the area into distinct segments, VÚVH



The LIFE Danube floodplains (LIFE14 NAT/SK/001306) initiative and cooperation of various stakeholders and competent authorities to improve the water regime has resulted in regular implementation of “simulated floods” which provide greater variability of discharges and timing related to life cycles of biota in this Natura 2000 site. The system of existing transverse weirs allows for several controlled-flood set-up variants, including flooding of the floodplain forests and wetlands while protecting riverbank settlements.

The stakeholder consortium, which includes water management authorities, the Gabčíkovo hydropower plant company, researchers, state nature conservation organisation, nature protection NGOs, angling association, land and forest owners, also cooperated to update the operational manual. The updated operational manual integrated Natura 2000 concerns into water management decision-making.

In addition, to fulfil the proposed plan of measures for this Danube floodplain area, several side-arms were restored by digging channels. Longitudinal continuity and fish migration were improved by reconstructing several inappropriate road crossing culverts. Over 75 hectares of wetlands were restored by dredging supply channels, and native tree species were planted while alien and invasive species were removed.

The initiative is one of the finalists of the 2024 edition of the European Natura 2000 Award: [https://environment.ec.europa.eu/news/restoring-danube-floodplain-largest-wetland-area-slovakia-through-conflict-resolution-2024-03-14\\_en](https://environment.ec.europa.eu/news/restoring-danube-floodplain-largest-wetland-area-slovakia-through-conflict-resolution-2024-03-14_en)

Project information: <https://broz.sk/en/projekty/dunajskeluhy/>



**Picture 3:** Simulated flood in the side arm system, spring 2024, with discharge 120 m<sup>3</sup>/s (BROZ archive)



**Picture 4:** Artificial inlet object from the canal to the side-arm system (author: VVB, 2023)



# BEST CASE EXAMPLES

## RIVER MORPHOLOGICAL ALTERATIONS AND DISCONNECTION OF WETLANDS/FLOODPLAINS

### • NATIONAL EXAMPLES

#### ROMANIAN EXAMPLES OF GOOD PRACTICES IN RELATION WITH MEASURES AIMED TO IMPROVE HYDROMORPHOLOGICAL CONDITIONS

The Romanian examples of good practices take into account projects implemented with funding from the Operational Program for Large Infrastructure 2014-2020 (investment priority "Protecting and restoring biodiversity and soils and promoting ecosystem services, including through Natura 2000 and ecological infrastructure") focusing on the ecological rehabilitation of three rivers: the Teslui River, the Balasan River and the Ialomița river.

##### **1. Project Title: Ecological Rehabilitation of the Teslui River to achieve environmental objectives in the Langa - Olt confluence sector, Olt County**

The measures take into account the management of aquatic vegetation and are located both in the riverbed and in the riparian zone, where the riverbed is completely obstructed by invasive vegetation. Vegetation removal and reshaping works on the riverbanks will be alternately carried out to create a water depth and flow velocity as close as possible to the natural dynamics and flow profile.

##### **2. Project Title: Ecological Rehabilitation of the Balasan River, Dolj County**

The designed technical solutions aim to renaturation of the riverbanks and restore the riverbed by removing existing concrete protections along the course of the Balasan river and rebuilding the bank protections with environmental friendly solutions that ensure the restoration of affected aquatic ecosystems. The developed section will be protected both on the banks and at the base with a three-dimensional geogrid erosion control mat, which will be covered with topsoil and seeded with grass.

##### **3. Project Title: Restoration of degraded riparian and stream ecosystems along the Ialomița river, downstream from the Glod confluence to upstream of the Pucioasa Dam and the tributary Ialomicioara downstream from the Valea Frumuselei confluence, Dâmbovița county.**

The designed solutions aim, in a first stage, at constructing facilities for the migration of fish fauna, in order to restore the longitudinal connectivity of the Ialomicioara River by building 4 fish pass ladders. Vegetative consolidations are planned to be executed both at the level of the high bank and the low bank in areas where the riverbanks morphology is affected by erosion and bank collapses. Ecological restoration works are complemented by vegetative plantings at the riparian zone level, elimination of invasive vegetation, restoration of arboreal species of edificatory importance that have been partially or completely replaced by allochthonous species to restore the natural habitat type and to ecologically restore alluvial habitats.

# BEST CASE EXAMPLES

## RIVER MORPHOLOGICAL ALTERATIONS AND DISCONNECTION OF WETLANDS/FLOODPLAINS

- **BASIN-WIDE INITIATIVES**

### CHAPTER ON NATURE-BASED SOLUTIONS IN ICPDR WFD-FD PAPER

The ICPDR HYMO TG, in close cooperation with the ICPDR FP EG, is jointly drafting a new chapter on “Nature-based solutions and flood protection measures” for the discussion paper “Coordinating the WFD and the FD: Focusing on opportunities for improving efficiency, information exchange and for achieving common synergies and benefits”. The aim of the chapter is to outline the importance of nature-based solutions in flood protection. Focusing on nature-based solutions in flood risk reduction, nature-based solutions can support to mitigate or prevent the negative impacts of floods, such as erosion, sedimentation, loss of vegetation cover, but at the same time mitigate drought risk, as well as provide other benefits for both people and the environment.

### JDS5 ACTIVITIES LINKED TO BIODIVERSITY AND HYMO ASSESSMENT

Following the commitment of Danube Ministers to “prepare a fifth Joint Danube Survey (JDS5) to be held in 2025”, the ICPDR HYMO TG agreed to strengthen the hydromorphological monitoring in the ICPDR JDS5, also covering a monitoring of sturgeon habitats (on the basis of existing data) in the planned HYMO JDS5 activities. The topic of sturgeon population monitoring is covered by the activities of the MA EG in the frame of JDS5. The HYMO related activities in JDS5 will also further help to better understand the relations between hydromorphological and biological quality elements crucial for best definition and prediction of significant hydromorphological alterations and consequently avoidance of negative impacts. The HYMO methodology prepared for the assessment in the JDS5 is closely coordinated between the ICPDR HYMO TG and the Danube Sediment Q2 and Danube4All project.

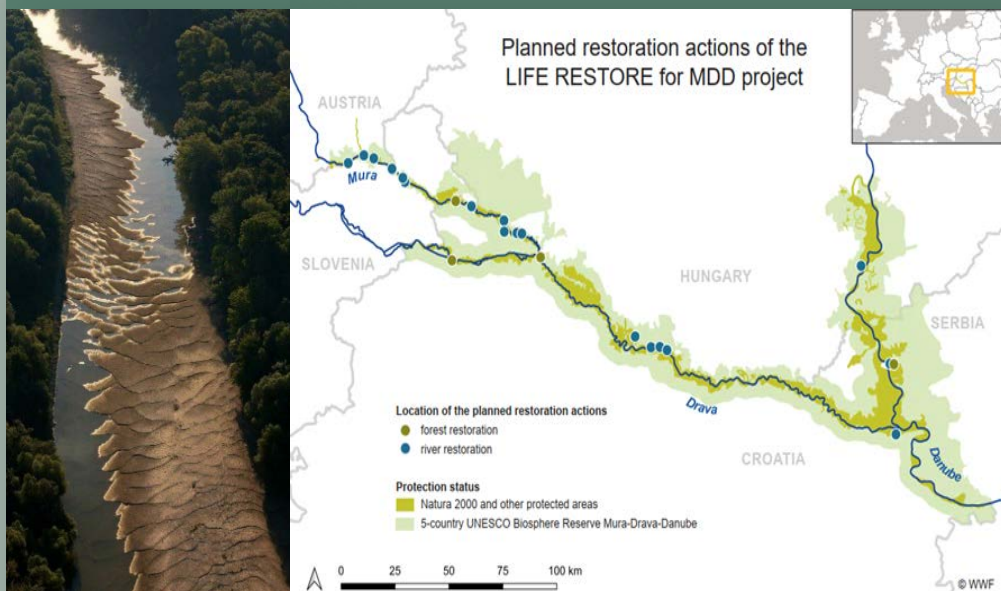


# BEST CASE EXAMPLES

## • TRANSNATIONAL PROJECTS

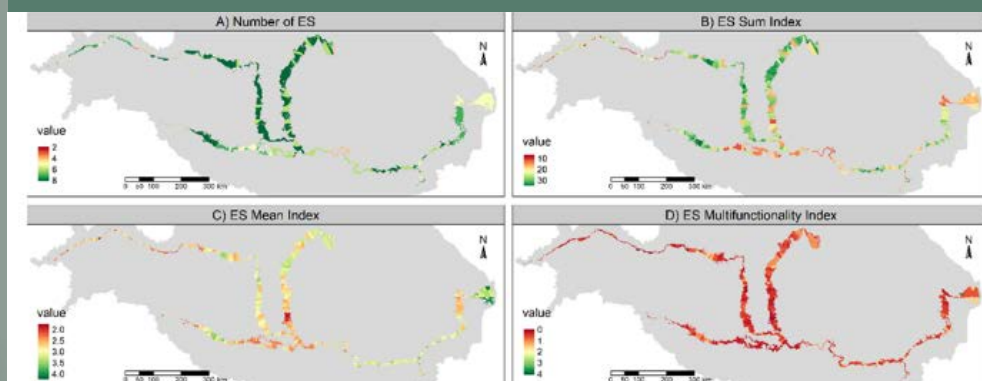
### LIFE RESTORE FOR MDD

The "LIFE RESTORE for MDD" project is a joint initiative of Austria, Slovenia, Croatia, Hungary and Serbia to preserve and restore the largest contiguous riparian forests in the UNESCO Five Countries Biosphere Reserve Mura-Drava-Danube, also known as the "Amazon of Europe". The project, which is co-financed by the European Union's LIFE programme with 67%, started on 1 October 2023 and will run for five years. With a total budget of €20,024,000, the project is being implemented by WWF Austria together with 16 partners from the five countries. Revitalisation measures are planned at 29 locations along the three rivers, covering an area of 2,100 km<sup>2</sup>. In 17 Natura 2000 areas, the project partners are reconnecting river branches, widening river beds and converting poplar plantations into more natural floodplain forests. The restoration measures are supported by comprehensive public relations work, environmental education and continuous monitoring.

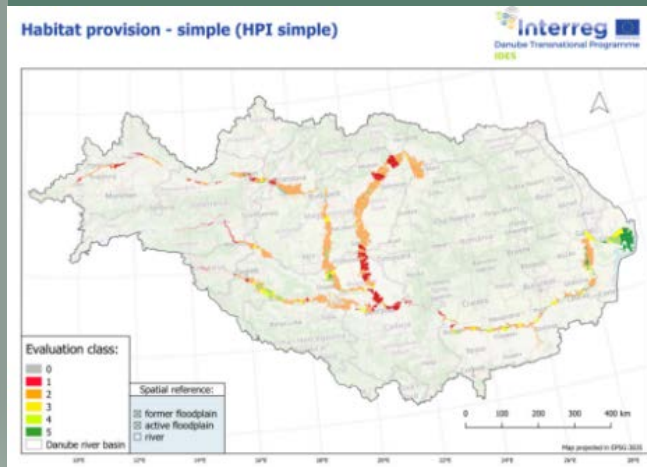


### IDES PROJECT

The EU Interreg project IDES (2020 – 2023) aimed at the long-term improvement of river and floodplain quality in the Danube river basin by identifying synergies with other sectoral policies using an ecosystem services (ES)-based approach. For this purpose, the IDES tool was developed, which allows the assessment of 25 different ES (incl. nutrient or flood retention, sediment and drought regulation, biodiversity, cultural ES, provisioning ES) using Europe-wide available data. The catchment scale assessment showed the synergies of protected areas and, in contrast, the negative impacts of hydromorphological pressures. At the local level, the assessment of ES and the experience of stakeholders were used in five pilot areas to develop water management concepts that integrate ES. The IDES manual and strategy as well as other documents can be found at <https://www.interreg-danube.eu/approved-projects/ides>.



**Picture 1:** Results of the assessment of regulating ES in 10 km floodplain segments for the Danube river, the rivers Tisza, Sava and Yantra using the IDES tool. A) number of ES assessed, B) sum of all individual ES scores of the 5-point scale, C) mean of all ES scores, D) multifunctionality index as the ratio of the number of high (4 and 5) to the low ranked ES (1 to 3).



**Picture 2:** Results of the assessment of the ES 'habitat provision' in 10 km floodplain segments for the Danube river, the rivers Tisza, Sava and Yantra.

## • TRANSNATIONAL PROJECTS

### DANUBE FLOODPLAIN PROJECT

Danube Floodplain Project - Reducing the flood risk through floodplain restoration along the Danube River and tributaries finalized in 2020 clearly indicates a floodplain reconnection potential along the Danube. A specific methodology, developed for the identification of potential floodplains was completed with a holistic tool to evaluate the multiple benefits of floodplain restoration and preservation. A more appropriate method, compared to a classic Cost-Benefit Analysis was the consideration of ecosystem services, thereby providing stakeholders and decisionmakers with strong arguments for considering restoration solutions.

More information can be found here:  
<https://www.interreg-danube.eu/approved-projects/danube-floodplain>.

**Preparing for the update of the Danube River Basin Management Plan (and national River Basin Management Plans) in 2027 and requested measures to address the implementation gap with regards to pressures resulting from hydromorphological alterations the following can be highlighted:**

- Hydromorphology needs to be considered and integrated in (spatial) planning approaches as well as new and upcoming projects related to flood protection, hydropower and navigation from the very beginning.
- Economic tools to monetarise the benefits of integrated solutions can support the decision-making process (MCA, CBA).
- Combined solutions, addressing environmental and flood protection objectives at the same time, are the way to success. The cooperation of the water management and flood protection sector is without alternative to identify measures that encompass multiple benefits addressing river basin management and flood protection measures but also biodiversity aspects.
- Concept of “space to rivers” combining environmental and flood protection objectives needs improved awareness raising amongst all sectors concerned and requires political support.
- Main obstacles and bottlenecks for the implementation of hydromorphological measures are the availability of land and the motivation of landowners to sell the land. Innovative solutions need to be found to address this topic by offering incentives and benefits to make land available.
- Funding opportunities from the Recovery and Resilience funds and LIFE projects are well fitting to finance hydromorphological measures with the aim to improve ecology, provide for better flood protection, fight the impacts of droughts and ensure attractive space for people. By including the “Do-not-significant-harm-principle” (DNSH) into the funding strategies and project implementation, the stakeholders have to ensure that investments not only achieve their intended goals but also contribute to sustainable development.

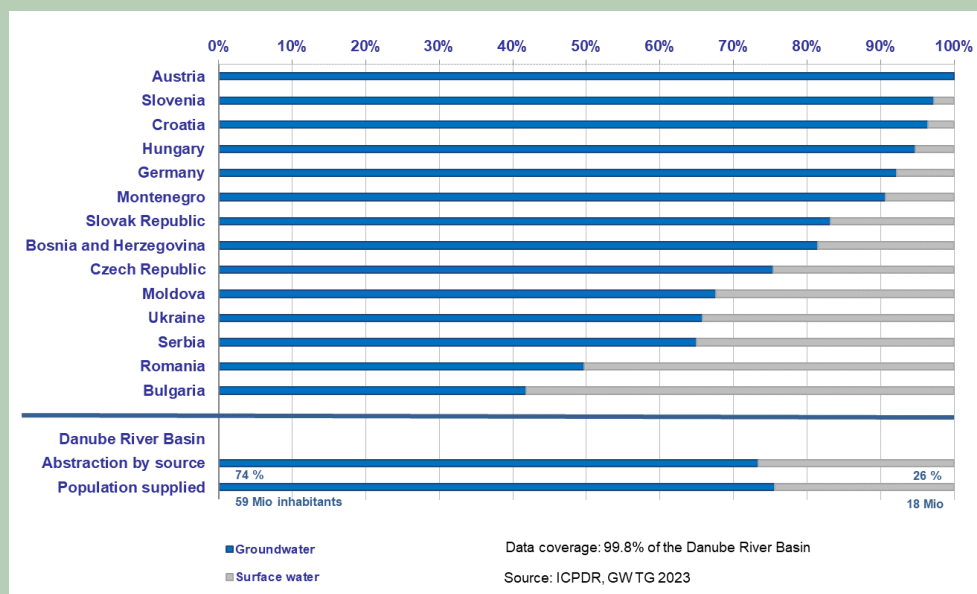




## 2.3 PROTECTION OF GROUNDWATER

Danube countries continue in their efforts in reducing inputs of nutrients and other pollutants into the groundwater to prevent deterioration of groundwater quality and to enable its restoration and preservation of good chemical status. Over-abstraction of groundwater is avoided by an effective water management under consideration of climate change effects leading to a balanced water use and good groundwater quantitative status in the Danube River Basin District (DRBD).

Groundwater in the Danube River Basin District is of major importance and is subject to a variety of uses with the main focus on drinking water, industry, agriculture, spa and geothermal energy purposes. Groundwater is the major source of drinking water in the DRBD. Data from 14 countries covering 99.8% of the area of the DRBD indicate that about 74% of the drinking water in the DRBD is produced from groundwater, serving at least 59 Mio. inhabitants.



The problem of groundwater is that once polluted, this may last for a long time, primarily due to the slow dynamic and slow renewal of groundwater. This means that pollution which happened many years or even decades ago can still show effects today. It also means that measures, which were implemented recently or in the past, to stop or remediate pollution, might only yield effects in years or decades to come.

Contamination by ammonium and nitrates is a key factor against achieving good chemical status of groundwater bodies in the DRBD. Therefore, it is essential to eliminate or reduce the amount of these substances entering groundwater bodies in the DRBD. Prevention of



deterioration of groundwater quality and any significant and sustained upward trend in concentrations of ammonium and nitrates in groundwater is being achieved primarily through the implementation of the EU Nitrates Directive and also the EU Urban Wastewater Treatment Directive.

To avoid the presence of hazardous substances in groundwater the measures as required in particular under the EU Water Framework Directive and its Groundwater daughter Directive, Regulation (EC) No 1107/2009 concerning the placing of plant protection products on the market and the Sustainable Use of Pesticides Directive are being implemented.

To prevent pollution of groundwater bodies by hazardous substances from point source discharges liable to cause pollution, the following measures are being applied: an effective regulatory framework ensuring prohibition of direct discharge of pollutants into groundwater; setting of all necessary measures required to prevent significant losses of pollutants from technical installations; and the prevention and/or reduction of the impact of accidental pollution incidents.

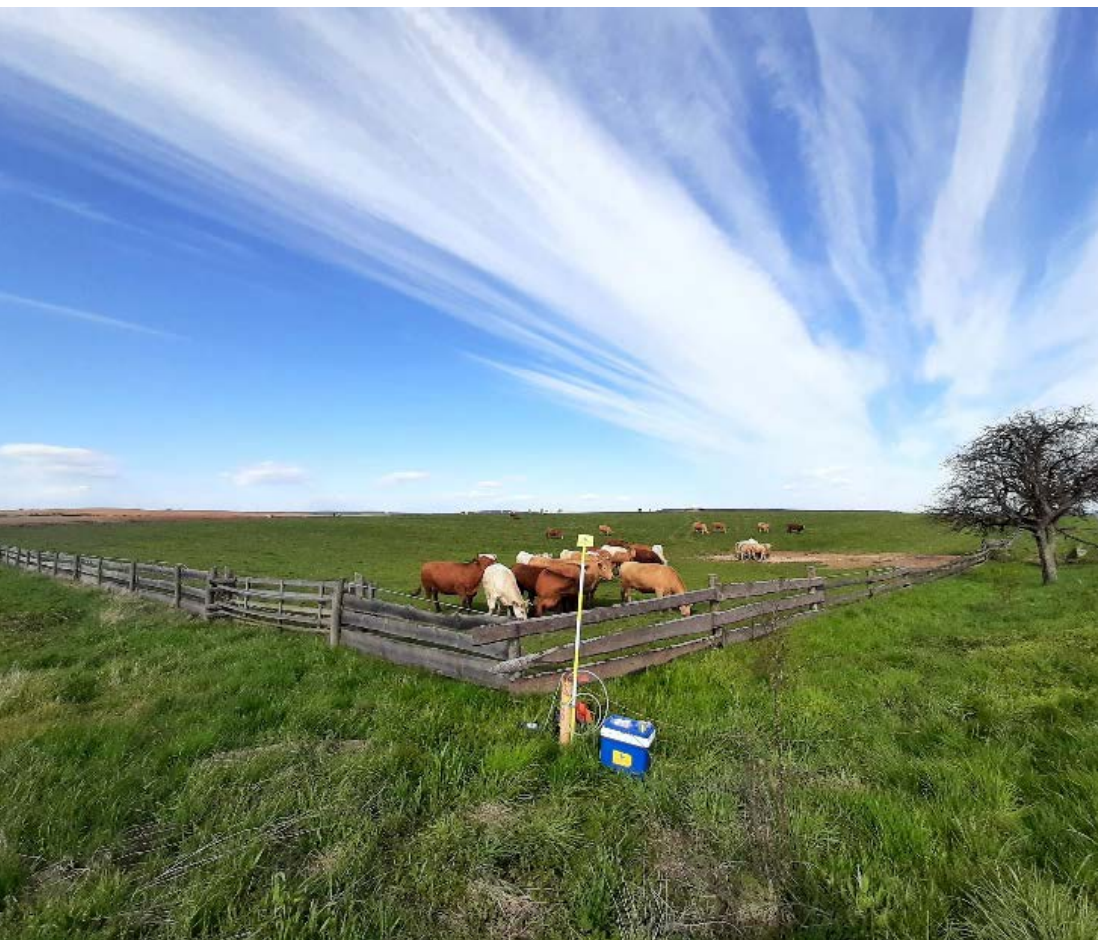
The measures addressing pollution of surface water bodies by organic substances, nutrients and hazardous substances have a positive effect on the improvement of the chemical status of groundwaters.

The over-abstraction of groundwater bodies within the DRBD is being addressed by effective groundwater and surface water management. The appropriate controls regarding abstraction of fresh surface water and groundwater and impoundment of fresh surface waters (including a register or registers of water abstractions) are put in place as well as the requirements for prior authorisation of such abstraction and impoundment. In line with the WFD, it must be ensured that the available groundwater resource is not exceeded by the long-term annual average rate of abstraction.

To prevent deterioration of groundwater quantity as well as the deterioration of groundwater associated aquatic ecosystems and dependent terrestrial ecosystems, solutions for the rehabilitation (e.g., natural water retention) are being explored. These include restoration of wetland areas, which are in direct contact with aquifers.

## NITRATE EARLY WARNING SYSTEM IN SLOVAKIA

The early warning system was established by the Water Research Institute in Slovakia in 2021 to promptly notify the relevant organizations when an extreme concentration of nitrate (> 250 mg/l) is detected in the groundwater. Subsequently, necessary inspections are carried out examining the farming practices in the related area. If needed, additional measures beyond the requirements of the action program according to the EU Nitrates Directive are suggested to farmers in order to improve the groundwater quality. The measures outlined in the action program can be accessed by farmers via an interactive map service. This service provides a user-friendly platform for farmers to access the required information to their specific fields.



## WATER METERING IN CROATIA

Within the National Recovery and Resilience Plan (2021-2026) the implementation of the water management program foresees the installation of digital water meters on all public water supply abstraction sites in Croatia (656 water meters to be installed). The main goal of the project is to establish the monitoring of all abstracted quantities of groundwater for public water supply and to enable continuous availability of real-time data to Croatian Waters. This project will significantly contribute to better preservation of groundwater resources, improvement of water management and more rational use of groundwater.



The Danube countries have been using different methodologies for the delineation and characterisation of GWBs, for the assessment of the chemical and quantitative status, for the establishment of threshold values and for trend and trend reversal assessments. Hence, it should be the aim to further harmonise the assessment methods and approaches towards better comparability of results.

Data gaps and inconsistencies are still available in the collected data, resulting in uncertainties in the data interpretation.

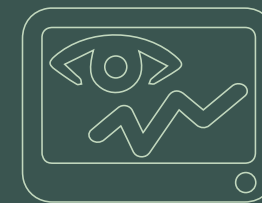
Also, the development and application of specific groundwater related models is a challenge for the coming years with the view of estimating trends and the necessary measures for achieving the good status in climate change conditions.

Ammonium, nitrates and pesticides mainly from agriculture are causing the failure of achieving good groundwater chemical status throughout the DRBD. The most important challenge will be to find an appropriate balance between agricultural production and good groundwater protection. The more and more frequent detection of persistent dangerous substances will cause mayor challenges in the next years/decades to come.

In order to achieve the EU Water Framework Directive environmental objectives until 2033 and beyond it is necessary in addition to the ongoing measures to encourage deliberate and effective water consumption by the civil, agricultural and industrial consumers. The most critical obstacle to achieve the good quantitative status of the water bodies is the overexploitation of the water resources. Mitigation of overexploitation and of uncontrolled, inappropriate water uses with governmental tools is less effective without involving citizens. The focus has to be given to raising public awareness towards the environmentally friendly, economic, efficient and safe water uses as well as strengthening the environmental consciousness of the public using social media, information materials and targeted guidance documents.



## 2.4 MONITORING ACTIVITIES INCLUDING JOINT DANUBE SURVEYS



Monitoring of water quality provides us with information on status of our waters, which is essential for designing appropriate measures to achieve good water status in the Danube River Basin.

With the aim to produce information on water status in DRB the ICPDR established TNMN which has been in operation since 1996. The major objective of the TNMN is to provide an overview of the overall status and long-term changes of surface water and, where necessary, groundwater status in a basin-wide context (with particular attention paid to the transboundary pollution load). In view of the link between the nutrient loads of the Danube and the eutrophication of the Black Sea, the monitoring of sources and pathways of nutrients in the DRB and the effects of measures taken to reduce the nutrient loads into the Black Sea are an important component of the scheme.

TNMN includes a joint monitoring activity of all ICPDR Contracting Parties, which produce each year data on concentrations and loads of selected parameters in the Danube and major tributaries and also collection of data on the status of surface water and groundwater bodies in the DRBD, to be published in the DRBM Plan every six years. A special investigative monitoring activity is Joint Danube Survey aiming at harmonisation of existing monitoring methodologies; filling information gaps in monitoring networks; testing new methods; or checking the impact of "new" chemical substances in different matrices. JDSs are carried out every 6 years.

To ensure the quality of collected data, a basin-wide Analytical Quality Control (AQC) programme is regularly organized by the ICPDR.

### ECOLOGICAL STATUS/POTENTIAL AND CHEMICAL STATUS OF SURFACE WATERS IN DRB.

In the DRBMP 2021 out of a 29,127 rkm network in the DRBD, good ecological status or ecological potential was achieved for 7,006 rkm (24.1%) and good chemical status was achieved for 10,495 rkm (36.0%).

The assessment of the ecological status according to the requirements of the WFD has been improved remarkably in the Danube River Basin and a significant support to this process was provided by the international harmonisation activities in the frame of the JDS4.

WFD-compliant biological sampling methods for small and medium sized rivers are already part of standard monitoring programs in most of the Danube countries. More problematic are the assessment methods for the ecological status in large rivers due to the difficult definition of reference conditions, the presence of multiple pressures and the influence of invasive alien species and climate change effects on biological communities.

There is a lack of experiences with methods for ecological potential assessment for HMWB stretches of the Danube and its tributaries (including reservoirs). Future activities have to be focused on sharing knowledge and harmonizing methods among the Danube countries how to assess the



ecological potential for relevant biological communities (especially for benthic invertebrates and fish). This should include experience with setting maximum ecological potential and selection of relevant biological quality elements and relevant metrics.

A factor, which adversely affects the chemical status in 2021 when compared to previous plans, is that certain Priority Substances from the Directive 2013/39/EU were not analysed before as they were not included in the Directive 2008/105/EC and in most of the Danube countries the EQSs set out in the Directive 2008/105/EC were applied for the DRBMP Update 2015. Other factors with an adverse impact are lowering of EQS of some Priority Substances from the Directive 2008/105/EC and inclusion of biota as a relevant matrix. In case the new Priority Substances (or PS with lower EQS or PS in biota) were analysed for DRBMP Update 2021 and the EQS were exceeded in some water bodies, which had good chemical status in 2015, the result was status deterioration despite no new pressures occurred.

A specific problem in the assessment of the chemical status are the ubiquitous Priority Substances, which are responsible for a significant part of the non-compliance. The problem with mercury was observed already in the DRBMP Update 2015 when the results of monitoring of mercury in biota led to failure in achieving good chemical status in all those countries, in which mercury was monitored.

It has to be also mentioned that in some countries certain Priority Substances are still not analysed because of lacking analytical instrumentation and because no proper or sufficiently sensitive methods are available (e.g., for PFOS, dioxins, dicofol, cypermethrin, benzo(a)pyrene, dichlorvos, HBCDD, heptachlor and heptachloroepoxide). Here the monitoring practices need further improvement in terms of method development, capacity building and enhancing of equipment.

#### JOINT DANUBE SURVEY 4

JDS4 was again the largest ever monitoring exercise in the DRB – but there was also another substantial added value: the greatest number of actively participating experts in the history of ICPDR activities resulted in a very intense hands-on monitoring exercise, which not only generated another huge amount of valuable data about the water quality in the Danube but also significantly strengthened the cooperation in WFD-related monitoring and assessment between the countries in the Danube River Basin. There was also an intensive public outreach disseminating JDS4 news to the stakeholders and wider public. The JDS4 motto 'Discover Danube', was designed as a call to public action towards a healthier and cleaner Danube.

#### The key findings showed that:

- For biological quality elements indicating pressure from nutrients and oxygen depletion by biodegradable substances – phytoplankton, macrophytes, phytobenthos, partly macrozoobenthos – a good status was observed at many sites and pointed at local pressure only. Fish and macrozoobenthos however indicated impacts induced by hydromorphological pressures at most of the sites. The indication of the ecological status assessment showed that the fish community is threatened along the whole river course.
- There is however a very good chance for improvement as the JDS4 results showed that still most species of the reference fish communities could be found at nearly all sites. This is even true for strongly altered hydromorphological stretches in the Upper Danube section. In total 76,265 specimens of 72 fish and three jawless species were detected. This underlines the importance of the Danube as a substantial source of fish biodiversity in Europe.
- The analysis of antibiotic resistant bacteria showed a significant increase in multi-resistance (acquired resistances to antibiotics from three or more tested antibiotic classes). The accumulation of resistance mechanisms in the Danube River *E. coli* population has continued over the last six years.
- Comparison of the nutrients data produced over last 20 years within the four JDS and by ICPDR annual TNMN monitoring showed high degree of comparability, despite the variability in sampling dates and personnel.
- Nineteen priority substances regulated in the European Water Framework Directive were analysed in water. Only for cypermethrin and cybutryne the concentrations above the Environmental Quality Standards (EQS) were observed at a few sampling sites. All other priority pollutants showed concentrations below the respective EQS.
- The results for mercury and brominated diphenylethers in biota showed concentrations higher than the EQS at all sites. Both compounds are considered as ubiquitous persistent, bioaccumulative and toxic substances. Whether the existing mitigation measures for these compounds are effective has to be shown in future monitoring programs.
- The first ever comprehensive screening of microplastics along the whole Danube established a baseline of pollution by microplastics in the DRB. In all water samples plastic polymers were detected and polyethylene was detected as the most abundant component of microplastics in almost all water samples. The screening of mussels discovered the presence of microplastics at all sites and revealed polyethylene terephthalate as the dominant plastic pollutant.





### BIODIVERSITY

**There are many different aquatic species living in the Danube. More knowledge is needed about their composition, how does it change over time and what influences it.**

The ICPDR has extensive data sets from biological monitoring, stored in the Danube River Basin Water Quality Database. Data on biological quality elements have been collected in a harmonized way at least since the start of the WFD implementation (2000 onwards) – in particular through the Joint Danube Surveys and TNMN monitoring as well as by national biological monitoring programmes. These data were evaluated primarily with respect to the ecological status assessment as required by the Water Framework Directive. The WFD assessment analyses the deviation from type-specific biological reference conditions. In this context, the analysis type-specific species and species composition includes some information on biodiversity, but biodiversity issues in particular regarding rare and endangered species have not been addressed in a detailed and comprehensive manner. However, the data collected so far provide a solid basis for a coherent and consistent treatment of biodiversity analysis/evaluation along the Danube, such as taxa distribution, change over time, and taxonomic issues.

The ICPDR is preparing the Aquatic Biodiversity Report, which focuses on aquatic biodiversity in the Danube including all habitat types within the wet river channel and the area of the intermittently inundated banks. This report is a living document - it represents the current state of knowledge (and its evaluation) and will be updated as new data becomes available.

**To develop the Aquatic Biodiversity Report, the following steps and analyses will be performed:**

- Comprehensive summary of the state of the knowledge on biodiversity in the Danube River Basin – overview analysis of existing data and trends.
- Analysis of methods for data collection (including sampling strategies) to ensure providing of comparable data on taxa richness for all biological quality elements, in spatial and temporal extent.
- Identification of what would be needed additionally to the analytical methods for the assessment of WFD ecological status to evaluate biodiversity as completely as possible.
- Selection of proper biodiversity parameters for assessment of changes in space and time;
- Analyses of changes in biodiversity parameters in a longitudinal gradient, as well as over the time.
- Defining the taxonomic approaches and the appropriate taxa nomenclature (selection of scientifically sound taxonomy to be used, based on recent taxonomic discussions);
- Defining of advanced taxonomical tools, such as eDNA for addressing taxonomy/biodiversity, as well as ecological status assessment;
- Identification of necessary steps to be taken for including the relevant biodiversity parameters into the integrated ICPDR Water Quality Database (DanubeTNMN) and the Danube GIS;

### QUALITY ASPECTS OF SEDIMENT MANAGEMENT

**River sediment is a suitable matrix for monitoring of persistent hazardous substances because it integrates, in time and space, the pollution in a specific water body.**

Characterisation of the sediment quality in the Danube under the ICPDR has been primarily based on the results of the Joint Danube Surveys. The monitoring activities showed that while concentrations of certain substances (organochlorinated compounds) in the solid phase were at low levels, heavy metals and polycyclic aromatic hydrocarbons occasionally occur at elevated concentrations requiring further research. Even though there are no specific measures addressing sediment quality proposed in the DRBMP 2021 it must be emphasized that all those measures foreseen in the Joint Programme of Measures for hazardous substances will be relevant for sediment quality as well.

The SIMONA Project was the response to the pressing demand of the effective use of sediment quality assessment for River Basin Management Plans according to the EU Water Framework Directive (WFD). Seventeen partners together with 13 associated partners, representing all Danube River Basin countries, have delivered a ready-to-deploy Sediment-quality Information, Monitoring and Assessment System to support transnational cooperation for joint Danube River Basin water management. The SIMONA Tool consisted of harmonised sediment sampling, analysis and risk assessment (evaluation) protocols, practical guidelines, manuals, professional video movies, recommendations, solid case studies and training materials. The SIMONA methods have been tested, demonstrated and trained in the transnational Drava River, Upper Tisa and South Danube Test Areas.

The more intensive sediment quality monitoring is hindered by the fact that the Directive 2013/39/EU did not set EQS for sediments. There exists a possibility of including sediment contamination directly within the status assessment procedure and there is a need to further examine the options for such approach.

### INVASIVE ALIEN SPECIES

**Invasive alien species have become one of the major concerns for the Danube and their further classification and analysis is essential for an effective river basin management.**

Based on the results of Joint Danube Surveys, the Danube River is significantly exposed to non-native species – 25 neophytes, 34 non-native aquatic macroinvertebrates and 17 non-native fish were recorded. Comparison of Danube Surveys data (JDS1-JDS4) clearly showed a constant impact of invasive alien species on native biota and a considerable increase of the number of non-native aquatic macroinvertebrate species. As a specific example the allochthonous Neogobius fish species can be given which were found in high or even dominating abun-

dance along the rip-rap protected banks in the upper and middle course of the Danube.

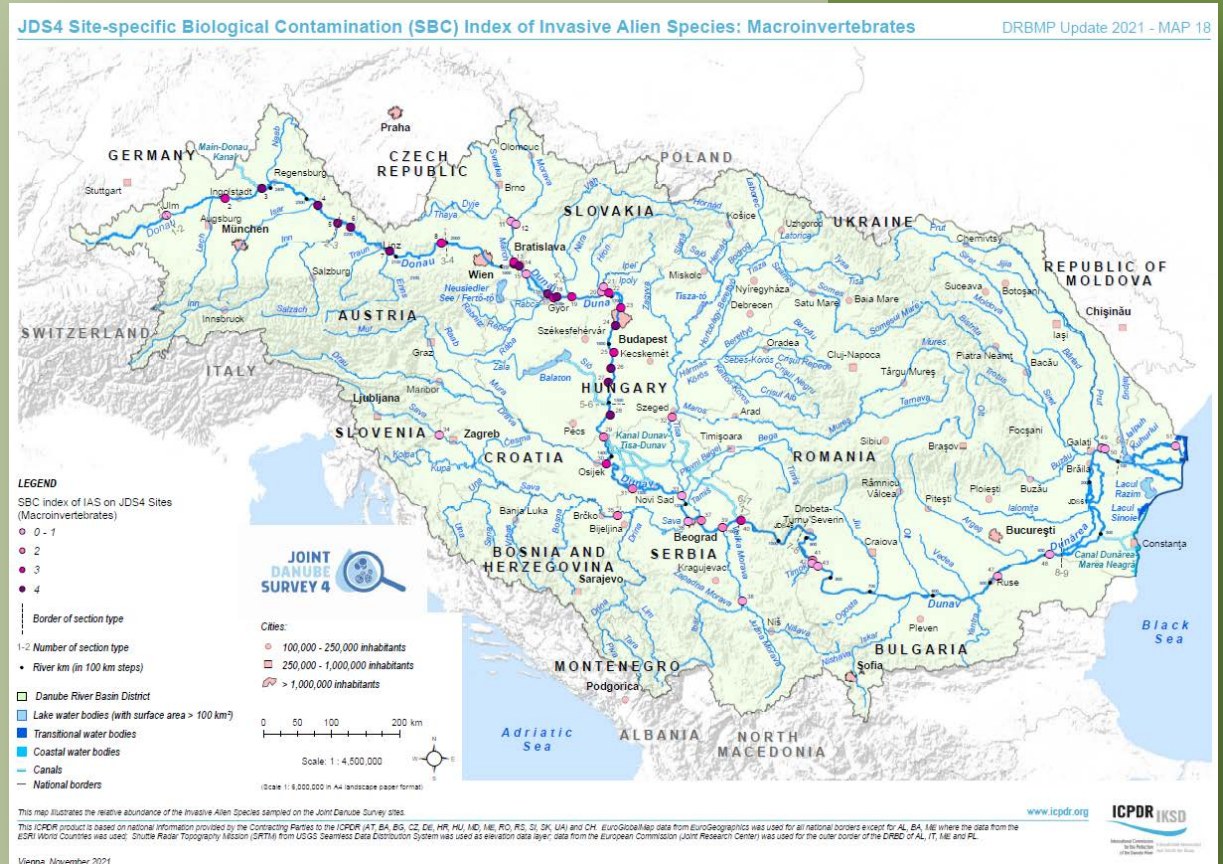
The data from the last two Danube surveys (JDS3 and JDS4) on macroinvertebrates and fish were used to assess the level of biocontamination at JDS sites by the BioContamination Index (SBC Index). The SBC assessment is derived from data on the number of non-indigenous species and their abundance in comparison to the total number of species and the community abundance. The index value ranges from 0 ("no" biocontamination) to 4 ("severe" biocontamination). It should be emphasized that the assessment of biological contamination, as a reflection of the level of pressure caused by the invasive alien species, should be observed independently from the ecological status assessment.

According to the results of the JDS3 and JDS4 macroinvertebrate surveys, the SBC Index indicated that majority of the sites could be characterized as highly to severely contaminated (SBC=4 and 3), while less sites have been characterized as moderately biocontaminated (SBC=2) or with low level of biocontamination (SBC=1). Mean values of the SBC Index based on macroinvertebrates ranged from 1.53 (JDS3 dataset) and 0.86 (JDS4 dataset) for the Lower Danube, up to 3.18 (JDS3 dataset) 2.56 (JDS4 dataset) for the Middle Danube and 3.07 (JDS3 dataset) and 3 (JDS3 dataset) for the Upper Danube.

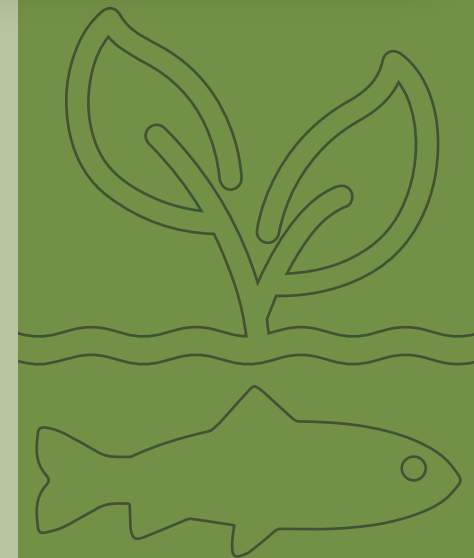
In future, it is important to evaluate accurately and rationally the real pressure of each invader to native ecosystems, because of its influence on the native biota should not be considered a priori as negative.

**In particular, the following actions are to be taken:**

- A systematic monitoring of invasive alien species is needed to summarize the state-of-the-art knowledge at the basin-wide level;
- It is of high importance to improve a methodology on how to assess invasive alien species as a specific pressure in the frame of the WFD compliant ecological status assessment. This issue includes developing reliable metrics that indicate the level of pressure caused by biological invasions, as well as clarifying the impact of this parameter on the ecological status assessment. More research is needed to properly deal with this issue;
- Only aquatic species will be taken into the consideration for all assessments;
- So far, the work of the ICPDR on the invasive alien species has been focused on the Danube. In future, the invasive alien species monitoring and assessment has to be extended to major tributaries and associated water bodies;



- The Black List of Danube invasive alien species includes all aquatic taxa that are on the list of invasive alien species of EU concern, and it also includes invasive species specific for the DRB. It is necessary to regularly update the Black List of Danube invasive alien species based on the new monitoring results;
- The presence of invasive alien species in a river water body cannot automatically be considered as an adverse impact to the ecological status. Invasive alien species should be used together with the native species as indicators for the influence of the existing pressures. A deterioration of the ecological status due to extreme dominance of invasive alien species is revealed by the decrease of indicators of the functionality of the ecosystem;
- Difficulties in management of invasive alien species are evident and are still an open issue.





### DROUGHT, WATER SCARCITY, EXTREME HYDROLOGICAL PHENOMENA AND OTHER IMPACTS

Anthropogenic emissions and atmospheric concentrations of CO<sub>2</sub> and other greenhouse gases as drivers of climate change have increased since the pre-industrial era, driven largely by economic and population growth. As a result, atmospheric and ocean temperatures have increased, the global mean sea level has risen and ice and snow cover have receded, not only in polar regions, but also, for example, in the mountain ranges of continental Europe. These changes have been accompanied by a slow shift in mean temperature and precipitation. At the same time, many regions are facing higher uncertainty due to more frequent and pronounced extreme weather phenomena, such as hot temperature extremes and heavy precipitation events. Important climate change impacts related to the Danube River Basin are shifts in precipitation patterns and snow cover and an increase in the frequency of flooding/flash flooding and droughts. Simulations show both a future increase in the intensity and frequency of dry periods, hot days and heat waves and local and regional increases in heavy rainfall (ICPDR Climate Change Adaptation Strategy 2019). Higher temperatures are also expected to lead to an increase in evapotranspiration rates, affecting vegetation, rivers and lakes and ultimately the water balance of the whole region. Drought and water scarcity will influence the stability of water dependent aquatic and terrestrial ecosystems and by that have severe economic consequences for society and for most economic sectors, particularly drinking water supply, agriculture, energy and transport. Consequently, climate change will have a wide range of effects in the Danube River Basin.

To reduce and manage the risks posed by climate change, both adaptation and mitigation measures are urgently needed. While adaptation is the process of adjustment to the actual or expected climate and its effects, mitigation

is the process of reducing emissions to limit future climate change. The adaptation to and mitigation of climate change plays a prominent role in the Danube River Basin, as also highlighted by Danube Ministers in the Danube Ministerial Declaration 2022 who “welcome the objectives and key messages of the updated ICPDR Climate Adaptation Strategy (2018)” and “reaffirm the “Effects of Climate Change (drought, water scarcity, extreme hydrological phenomena and other impacts)” as a new significant water management issue for the Danube River Basin”. Danube Ministers call for actions to be undertaken in the years 2022 to 2027 by “developing sustainable adaptation measures to urgently enhance resilience of aquatic ecosystems to climate change impacts, supporting water balance activities and enhancing cooperation and exchange of good practices on adaptation measures to climate change impacts.” As a leader and pioneer among transboundary river basin commissions in responding to climate change, the ICPDR adopted the first ICPDR Strategy on Adaptation to Climate Change in 2012. Based on its strategy, the ICPDR fully integrated climate adaptation issues in its updated Danube River Basin Management Plan and in the first Danube Flood Risk Management Plan in 2015.

An update of the ICPDR Strategy on Adaptation to Climate Change was prepared in the year 2018. The 2018 Update of the ICPDR Strategy on Adaptation to Climate Change takes further steps to promote action in a transboundary context and aims at offering guidance on the integration of climate change adaptation into ICPDR planning processes. Further, it promotes multilateral and transboundary cooperation action in the context of climate change adaptation and serves as a reference for national policy makers and other officials. An overview of potential adaptation measures is included in the strategy.

The ICPDR approach that guides the integration of climate change adaptation into ICPDR activities can be summarised as follows:

- A joint understanding of scenarios, impacts and adaptation measures and sharing a scientific knowledge base is essential for joint decision making in a transboundary basin such as the Danube River Basin.
- The ICPDR Climate Change Adaptation Strategy does not include a separate programme of measures but relevant actions are incorporated in activities outlined in the Danube River Basin Management Plans and Flood Risk Management Plans.
- Since climate change is a key cross-cutting issue, all ICPDR Expert Groups and Task Groups are mandated to fully integrate climate change adaptation in the development of the Danube River Basin Management Plan and the Danube Flood Risk Management Plan.
- The ICPDR Climate Change Adaptation Strategy focuses on issues relevant at the Danube basin-wide level (level A) and needs to be complemented with further detailed planning on adaptation at sub-basin, national and/or sub-unit level.
- Consultation on competing uses and priorities to prevent potential conflicts is needed to take into account potential target conflicts and competition between different water-related users and sectors such as agriculture, navigation, water supply, energy, industry, tourism, environment and nature protection.
- The communication, coordination and stakeholder involvement on climate change adaptation issues among different levels of management in the Danube River Basin must be ensured at the national level, throughout the ICPDR and also across projects.
- Building resilience against climate change impacts water resources through capacity building, transboundary cooperation and benefit-sharing is a key priority to address climate change in the Danube River Basin.

With regards to droughts in the Danube River Basin, the ICPDR is currently preparing an “Overview Report on Droughts in the Danube River Basin”, including analyses on policies and strategies, national drought management plans and response mechanisms, monitoring and forecasting tools, risk assessment methods and impact databases, as well as nature-based solutions and mitigation measures that have been implemented in the Danube countries. As a key outcome, the Overview Report will present a list of suggestions for possible basin-wide activities regarding droughts that could be tackled in future within the ICPDR framework.

Additionally, the Danube Water Balance project (2024-2026) will support Danube countries with the development of a harmonized water balance modelling system in the Danube River Basin following the CWatM model setup. The project will establish the basis of a common data management concerning the water balance instead of scattered data availability in different countries and different national calculation and modelling methods. The model will additionally be tested in four pilot sub-basins, Morava, Tisza, Upper-Sava and Drina, along with climate scenarios.

## REPUBLIC OF SERBIA

Pursuant to the Law on Climate Change, adopted in 2021 (hereinafter: Law), in December 2023, the Government of the Republic of Serbia adopted first Climate Change Adaptation Programme for the period 2023-2030 (hereinafter: CCAP). CCAP contains, as its integral part, the Action plan for the period 2024-2026, with 25 prioritised adaptation measures in relevant sectors (agriculture, forestry, energy, transport, urban development, biodiversity, and human health), that are based on a scientific analysis of the climate change impact of on sectors and systems, and in accordance with the requirements of the international community.

The climate-related hazards that cause the most significant damage and losses in Serbia and whose intensity and frequency are increasing include heat waves, intense precipitation, and droughts. Other caused by climate change and manifesting depending on the regional characteristics are floods, landslides, rockfalls, fires, etc. Therefore, the CCAP aims to provide capacities for improving timely information to the public about weather, climate conditions and climate hazards to increase the individuals, entrepreneurs, and employers’ preparedness. At the same time, it enables the implementation of adaptation measures that have been identified as the most urgent to prevent a multiple increase of damages and losses due to climate change impact and ensures the adaptation mainstreaming through amendments and changes to national regulations and methodologies and provides the conditions for increasing the capacity for education about climate change and risks.

CCAP includes analysis of observed and future climate change scenarios and due to the accelerated changes in the climatic impact-drivers, a new climate change analysis has been prepared that included the observed situation until 2020 and projections with two future climate projections scenarios of future greenhouse gas emissions, RCP4.5 and RCP8.5, for the selected future climate periods, according to the methodology used for the most recent IPCC report, i.e., IPCC Sixth Assessment Report.

To identify the adaptation measures, the vulnerability and risk assessments analysis has been prepared for the sectors where there was sufficient knowledge, i.e. data and information, available, while for other sectors, the climate change impacts and specific measures have been identified in accordance with the current knowledge, with the aim of expanding that knowledge in the future. The prepared analyses and the proposed measures have a scientific background and are supported by the scientific literature and methodologies.

While water resources have not been considered as a separate sector, the information from the climate vulnerability assessment for water resources has been included in the sectoral analyses through the nexus approach. CCAP considers the atmosphere, soil and water are as inseparable climate system components, necessary for the social systems functioning. Since Nature-based solutions are recognized to have a significant potential in Serbia to serve as adaptation measures with co-benefits in mitigation, climate change analysis for the CCAP was revised and included the nexus concept: atmosphere(air)-water-land, especially in agriculture, and recognized the multisectoral contribution of measures, with priority sector as a leading for implementation of the measure.

The Republic of Serbia has developed the Digital Climate Atlas of Serbia-web platform ([atlas-klime.eko.gov.rs](http://atlas-klime.eko.gov.rs)) as a tool for the integration of adaptation to climate change into medium- and long-term planning and which will serve as the basis for all climate-related initiatives, to improve understanding of the baseline situation, improve vulnerability assessments, strengthen justification for CCA interventions and improve decision-making capacity. It includes climate data used for specific risk & vulnerability assessments which comprehend observed and future climate data and is publicly available and can be used by different stakeholders for vulnerability and risk assessments, as well as for identification of adaptation options at sectoral, subnational, and national levels, including for the priority areas/sectors.





## AUSTRIAN DRINKING WATER SECURITY PLAN

Like the rest of Europe, Austria is experiencing increasingly long periods of drought and heat. In recent years, this has also triggered concerns about the safety of drinking water supplies. The drinking water security plan provides an analysis of the legal basis for emergency scenarios and it contains a specific program for long-term security of the drinking water supply for the population in Austria, including the improvement of data basis and forecasts for prevention of as well as preparation of measures in the event of water scarcity, financial support of research on efficient water use and securing the water supply, funding of measures to adapt the water supply to climate change and information campaigns on conscious use of drinking water. With the plan issued in 2023, the Federal Ministry of Agriculture, Forestry, Regions and Water Management wants to actively support and advance the joint efforts of the federal government, federal states and municipalities to secure the long-term drinking water supply for the population in Austria over the next years.

More information can be found [here](#).

## CZECH OPERATIONAL DROUGHT MANAGEMENT PLANS

In reaction to serious drought period in previous years, it became apparent that the Czech Republic urgently needed comprehensive legislation addressing drought and water scarcity. As a result, an amendment to the Water Act prepared by the Ministry of Agriculture and the Ministry of the Environment was approved in late 2020. The system of operational management during droughts, when a 'water scarcity state' is declared, allows for the adoption of superior measures, similar to those during flood. Czechia recognized that drought and floods are a consequence of ongoing climate change, to which it is necessary to adapt and, from the position of the State, both to prepare gradually (in the long term) within the framework of river basin management plans and Adaptation Strategy of Czech Republic and to react promptly to the adverse situation.

The amendment defined drought and water scarcity and also clearly set the hierarchy of water needs during periods of water scarcity. The main innovation is the establishment of drought commissions at the regional and central levels, which will be able to declare "water scarcity state" and apply certain superior measures in water use and control based on the newly created operational Drought and Water Scarcity Management Plans.

The overarching Drought and Water Scarcity Management Plan for the Czech Republic is based on regional plans that were completed and published in late January 2023, and was completed and made publicly available on January 31, 2024. The main objective of the operational plan is to propose potential actions during a prolonged drought to ensure sufficient water to meet basic human needs, and to minimize the impacts of drought and water scarcity on economic activity and the environment. In particular, the plan includes a delineation and description of the area, identifying water sources, major water users, a description of the risk of drought including its potential impacts, and a proposal of possible approaches and appropriate measures, including restricting water uses.

Czech Republic has been developing innovative drought monitoring and prediction system HAMR (Hydrology Agronomy Meteorology Retention, [hamr.chmi.cz](http://hamr.chmi.cz)). It serves the general public for better information on the current status and development of drought. The part of HAMR, which is already aimed directly at water authorities and drought management commissions, provides the necessary support for drought management as required by the amendment to the Water Act.

## CASE STUDY INTERIM REPORT – ROMANIA "ROMANIA DROUGHT RISK ASSESSMENT"

During the summer of 2022, Europe faced the worst drought in at least 500 years. According to the European Drought Observatory, at least two-thirds of the continent was in drought alert or warning state, severely impacting the economic sectors. Also, Romania was severely affected by the drought in 2022.

In this context a Drought Risk Assessment has been elaborated by the World Bank with the support of the National Administration Romanian Waters, the Romanian Water Association, the National Regulatory Agency for Communal Services, and the Ministry of Environment, Waters and Forests providing data or for supporting the data collection. The report "Romania Drought Risk Assessment" thoroughly examines current and projected drought risks in Romania, marking the initial phase towards a complete Drought Risk and Resilience Assessment.

Drought hazards and impacts were evaluated using data from vital sectors such as water supply, energy, agriculture, environment, and transport. By comparing these data with a time series of standardized drought indices, which represent the drought hazard, the analysis revealed the substantial impact of recent droughts in Romania and the significant risks faced by various sectors.

The assessment of drought impacts on water supply involved analyzing time series related to water supply and evaluating current drought risk management strategies through interviews with key stakeholders, including water service providers and the National Administration 'Romanian Waters'. Although large-scale water supply disruptions have not yet occurred, an increasing number of water service providers were being affected by droughts, highlighting the urgent need for improved drought assessment and preparedness.

The drought risk assessment employed an innovative data-driven methodology that integrates drought risk drivers, impacts, and their interconnections with natural and human systems through machine learning. This approach, recently developed by the Joint Research Centre of the European Commission for the EDORA Project, facilitated the creation of a pan-European Drought Atlas. The model performance provides a comprehensive overview of current and future drought risks by all assessed sectors (agriculture, water supply, hydropower, and forest and wetlands ecosystems).

Based on the assessment of drought impacts and risks, and following extensive interviews with representatives from key stakeholders, several opportunities and some recommendations to enhance Romania's drought resilience have been identified. The assessment underscored the need for proactive drought risk management and highlighted opportunities to enhance resilience against future drought events since climate change is expected to exacerbate these risks, with projected climate data indicating a notable increase in drought hazard.



In a changing climate, the objectives of the EU WFD can only be met if expected climate change impacts, especially changes in the hydrological regime leading to an increased likelihood of drought and water scarcity, are taken into account when planning and implementing the programme of measures. Effective implementation of such measures depends on coherent policies and cooperation on all scales – international, regional and national – and requires integrated responses that link mitigation and adaptation with other societal objectives, i.e. measures need to be "climate proof". This means that the respective measures must achieve the desired results without negative and unintentional side effects even under changed climate conditions. This will be ensured by integrating climate change into the approaches adopted to address the main pressures in the Danube River Basin with regards to pollution and hydromorphological pressures as well as via a coordinated implementation of the EU WFD and EU FD as well as other relevant environmental Directives in the Danube River Basin.



## 2.7 INTER-SECTORAL COOPERATION (INCLUDING HYDROPOWER, NAVIGATION, AGRICULTURE) AS KEY TO SUCCESS TO CREATE SYNERGIES AND AVOID POTENTIAL CONFLICTS

The inter-sectoral cooperation of the water management sector with other sector policies is an important aspect in the Danube River Basin in order to create synergies and avoid potential conflicts. Considerable efforts are also being made towards the coordination of water management with the sustainable management of floods according to the EU Floods Directive (EU FD) as well as the marine environment and the Black Sea, taking into account the EU Marine Strategy Framework Directive (EU MSFD). Additional opportunities for Danube basin-wide level exchange between the sectors also have to be identified and followed up.

Activities are ongoing to continuously implement and further intensify the exchange with different sectors such as inland navigation, hydropower, agriculture, but also with regards to nature protection including sturgeon conservation activities as highlighted in chapter 2.8.

### RIVER BASIN MANAGEMENT AND FLOOD RISK MANAGEMENT

Flood events are natural phenomena of all river systems but, as has occurred over recent years in the Danube Basin, they can often have disastrous social, economic, and environmental consequences. Climate change is expected to increase the magnitude and frequency of flood events and the coming decades are likely to see a higher flood risk in Europe. While flooding cannot be prevented entirely, preserving and returning rivers and floodplains to a more natural state and implementing sustainable measures across the basin can greatly reduce the likelihood of flood events and the damage they cause. The increasing overall damage might be reduced if the land use along rivers changes. In this regard, the issue of floodplain restoration to mitigate flood risk while improving the ecological status/potential of the water bodies in relation to hydromorphological alterations in the Danube River Basin needs to be highlighted. The coordination of the EU WFD and the EU FD offers the opportunity to optimize synergies and minimise conflicts between varying interests, aiding the efficiency of the implementation of measures and increasing the efficient use of financial resources. Member States are asked to take appropriate steps to coordinate the implementation of both Directives. In order to address the coordination between the EU WFD and the EU FD in the ICPDR, a discussion paper “Coordinating the EU WFD and the EU FD: Focusing on opportunities for improving efficiency, information exchange and for achieving common synergies and benefits” was jointly developed by the Hydromorphology Task Group (HYMO TG) and Flood Protection Expert Group (FP EG) of the ICPDR. The document outlines objectives and measures of the EU WFD and EU FD and describes potential conflicts. It highlights synergies between EU WFD and EU FD objectives and measures with a particular focus on win-win solutions. Currently, the discussion paper is in the process of being updated with a chapter on “nature-based solutions and flood protection measures” to highlight the importance of nature based solutions in flood risk reduction, where these can support to mitigate or prevent the negative impacts of floods, such as erosion, sedimentation, loss of vegetation cover, but at the same time mitigate drought risk, as well as provide other benefits for both people and the environment.



**Picture:** Widening of river channel as a nature-based solution bringing also positive effects on flood risk reduction (copyright Petra Repnik, NBS chapter)



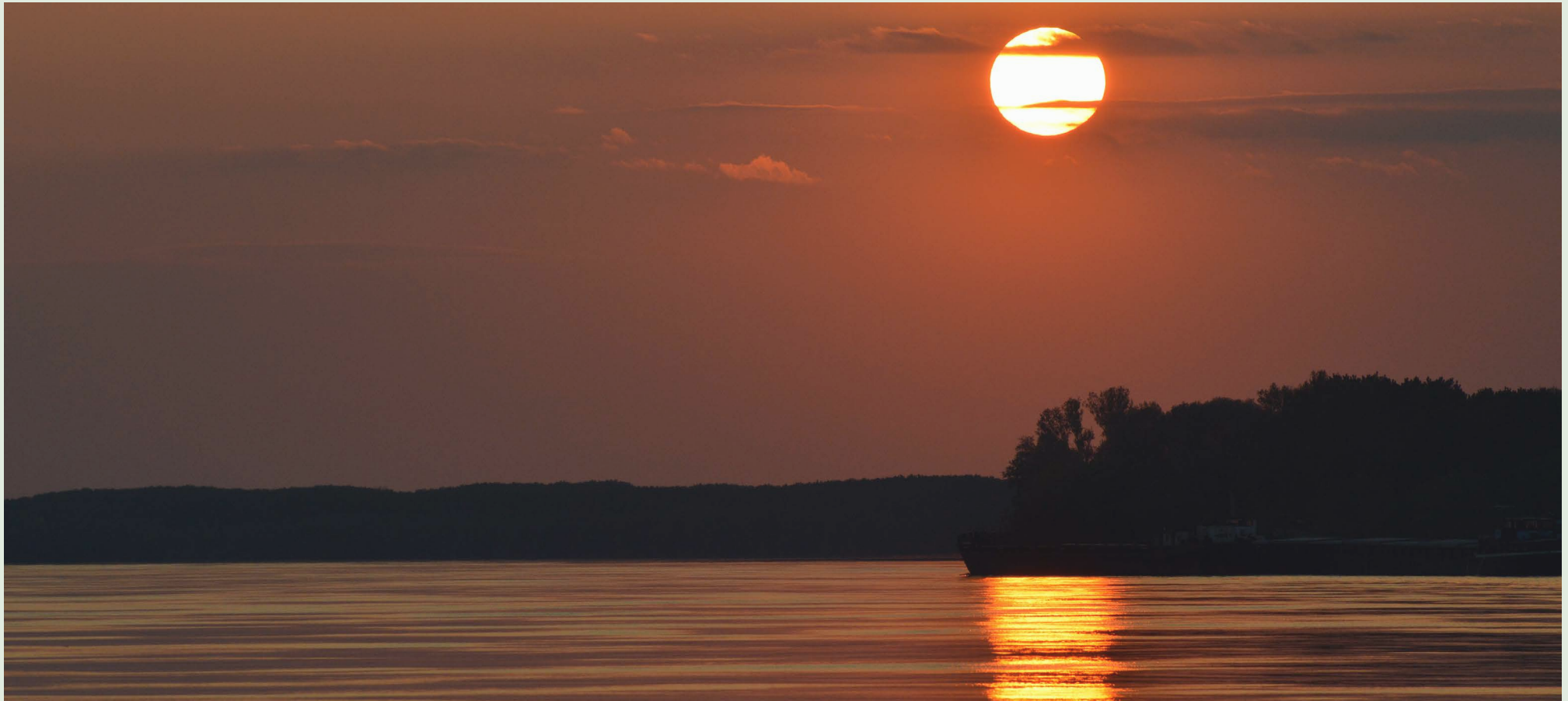
## RIVER BASIN MANAGEMENT AND THE MARINE ENVIRONMENT

The marine environment provides habitats for rich (yet often unknown) marine biodiversity and support essential services for people, such as food provision, climate regulation and recreation. Protecting the marine environment is thus not only crucial for the conservation of biodiversity but also for the wellbeing of humans and the planet. However, the marine environment and its ecosystems are subject to multiple pressures and impacts from human activities, such as fishing, seabed disturbance, pollution or global warming. Many of the pressures affecting the riverine and marine environment are generated on land. Therefore, the EU MSFD and the EU WFD target a similar range of pressures and drivers (human uses and activities) and share a large number of measures. With the Danube flowing into the Black Sea, the Danube River Basin is directly linked with marine waters. The flagship species of the Danube River Basin, the sturgeon, live mostly in the Black Sea, and migrates up the Danube and other major rivers to spawn (reference to sturgeons chapter). In the year 2012, the ICPDR adopted a resolution declaring “the willingness of the ICPDR to serve as platform facilitating the coordination with land-locked countries required under EU MSFD Article 6(2) and to contribute hereby to a close coordination of the implementation of the EU WFD in the Danube River Basin and the EU MSFD in the Black Sea Region”. The ICPDR and the International Commission for the Protection of the Black Sea (ICPBS) signed a Memorandum of Understanding (MoU) on common strategic goals as early as 2001. Romania and Bulgaria, the EU MS of the Danube basin sharing the Black Sea waters, are working on the implementation of the EU MSFD. Danube Ministers declared in the Danube Ministerial Declaration (2022) to “encourage Romania and Bulgaria, the EU Member States of the Danube River Basin sharing the Black Sea waters, to continue working on the coordination of the implementation of the Marine Strategy Framework Directive in the Black Sea Region in close cooperation with the Black Sea Commission.”. Romania underlined in the 26th Ordinary

Meeting in December 2023 that the collaboration with the ICPBS should continue and should have priority despite the current war situation in the Black Sea. At COP-23 (Barcelona Convention) in Portoroz (5 December 2023) a trilateral side event on transboundary cooperation from Source to Sea: “Danube, Mediterranean and Black Sea” was organised. The ICPDR, the BSC and the Mediterranean Initiative presented at the event. The discussion’s conclusion highlighted a revived and intensified exchange between the ICPDR and BSC in future also involving the Mediterranean Initiative (Barcelona Convention - UNEP/MAP). As a follow-up to this activity and based on the initiative of Slovenia, the ICPDR, the Black Sea Commission and the UNEP MAP (Barcelona Convention), the 1st Joint Consultation meeting to strengthen transboundary collaboration took place in the BSC Secretariat premises on 16 May 2024. Emphasis was given to the ICPDR – BSC cooperation also involving the UNEP MAP (Barcelona Convention), to identify common grounds and to discuss an intensified trilateral cooperation that aims to strengthen transboundary collaboration from Source-to-Sea in the Danube River Basin, the Black Sea and Mediterranean Sea regions. This collaboration was initiated in the spirit of the implementation of the bilateral Memorandum of Understanding (MoU) between the ICPDR-BSC and the UNEP/MAP-BSC intending to establish a broader cooperation aimed at harmonizing future activities, avoiding duplications and promoting synergies to promote sustainable blue and green economy within the Danube, Black Sea and Mediterranean basins. The participants of the 1st Joint Consultation Meeting prepared a document on the meeting’s outcomes, which includes a roadmap for possible future joint undertakings to strengthen transboundary collaboration from Source-to-Sea in the Danube River, the Black Sea and the Mediterranean Sea.







## RIVER BASIN MANAGEMENT AND NATURE PROTECTION

The aim of ensuring healthy water related ecosystems while at the same time seeking to achieve a balance between water and nature protection as well as the sustainable use of nature's natural resources is the objective of EU water and nature legislation. The EU Birds and the EU Habitats Directives are the backbone of EU's biodiversity policy as they protect Europe's most valuable species and habitats. The protected areas designated under these directives form the so-called Natura 2000 network. With the launch of the EU Green Deal and the adoption of the new EU Biodiversity Strategy for 2030, an additional emphasis has been placed on river basin management, increased efforts to protect and restore natural ecosystems as well as the sustainable use of resources. This is essential to preserve and restore biodiversity in lakes, rivers, wetlands and estuaries, and to

prevent and limit damage from floods. Danube Ministers emphasised in the Danube Ministerial Declaration (2022) "the significant potential for synergies with the EU Water Framework Directive, and the EU Biodiversity Strategy for 2030, especially with regard to the targets on protected areas, restoration and species/habitats conservation improvement and stresses the need to strengthen cooperation with nature protection authorities." Measures implemented by Danube countries to achieve the good ecological status and good ecological potential of water bodies contribute to the restoration of degraded habitats or can even create new ones which are beneficial for a wide range of species (e.g. fish, reptiles, mammals, amphibians, mussels), some of them even either classified as endangered by IUCN (e.g. the Danube sturgeons, Danube salmon, freshwater pearl mussels) or under special protection by the EU Birds and Habitats Directive (e.g. European beaver, European otter, European pond turtle, fire-bellied toads). Measures target-

ing the restoration of river continuity in the Danube and its major tributaries, the identification of key habitats with a view to initiating creation and protection of ecological corridors along the Danube and its main tributaries and preserving the flagship species Danube sturgeon represent important efforts to preserve biodiversity in the Danube River Basin. Nature-based solutions such as floodplain restoration measures provide flood protection, and at the same time support achieving higher quality ecosystem services like improved water quality, improved conditions for biodiversity conservation and improved recreational value. Currently, the preparation of the "ICPDR Aquatic Biodiversity Report" informing how many and which species are present, how does the composition of species change over time and what influences biodiversity in the Danube River Basin is in progress.

## INLAND NAVIGATION AND THE ENVIRONMENT

Inland navigation can contribute to making transport more environmentally sustainable, particularly where it can act as a substitute for road transport. It can, however, significantly influence river ecosystems, potentially jeopardizing the goals of the EU WFD. Recognising this potential conflict, the ICPDR, in cooperation with the Danube Commission (on Navigation) and the International Commission for the Protection of the Sava River Basin, initiated a cross-sectoral discussion process involving all relevant stakeholders and NGOs leading to the publication of the “Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin” finalised in October 2007. The Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin summarises principles and criteria for environmentally sustainable inland navigation on the Danube and its tributaries, including the maintenance of existing waterways and the development of future waterway infrastructure. Danube Ministers emphasised in the Danube Ministerial Declaration (2022) to “support the continuation of cooperation and meetings with the Danube Commission on the Joint Statement on Development of Inland Navigation and Environmental Protection and the EU METEET (The Mixed Environment Transport External Expert Team) initiative.” A process to update the Joint Statement and the PLATINA manual as agreed by the three Commissions (ISRBC, ICPDR, DC) is currently ongoing. The related process is titled Joint Statement 2.0 Process (JS 2.0 Process). The reopening of the Joint Statement process will reflect new challenges and changes in the project landscape and should support the achievement of the Good Navigation Status (GNS) and Good Ecological Status (GES) / Potential (GEP) as well as favourable conservation status in the Danube and Sava River basin. Furthermore, it shall support the creation of a resilient Danube and Sava River basin coping with changes to river basins caused by climate change (floods/droughts/low water levels) by implementing an integrative management approach as a new standard that addresses river dynamics and a quickly changing climate with innovative and flexible actions and solutions.

## SUSTAINABLE HYDROPOWER

The increased production and use of energy from renewable sources, together with reductions in energy consumption and increased energy efficiency, constitute important steps towards meeting the need to reduced greenhouse gas emissions to comply with international climate protection agreements. Aware of the fact that hydropower plants offer an additional reduction potential for greenhouse gases but also recognizing their potential negative impacts on riverine ecology, the Ministers of the Danube countries decided in 2010 that general Guiding Principles on integrating environmental aspects into the use of hydropower should be established for the Danube River Basin. In the frame of a broad participative process launched in 2011, “Guiding Principles on Sustainable Hydropower Development in the Danube Basin” were elaborated with the aim of ensuring that environmental concerns are integrated into processes relating to hydropower development, dealing with the potential conflict of interest from the beginning. The Guiding Principles were adopted by the ICPDR in June 2013 and are available in Bosnian, Croatian, Czech, German, Slovak, Slovene and Ukraine language. Danube Ministers emphasised in the Danube Ministerial Declaration (2022) to “encourage further application of the “Guiding Principles on Sustainable Hydropower Development in the Danube Basin” and the continuation of organisation of ICPDR Hydropower Workshops.” Following previous ICPDR Hydropower Workshops from the years 2017 as well as 2021, the aim of the ICPDR Hydropower Workshop 2024 is to bring together experts from administrations working on the implementation of energy and environmental policies, representatives from both the hydropower sector and NGOs and researchers to discuss the progress made and the remaining challenges for ensuring the sustainability of hydropower and to reflect on “10 years” of “Guiding Principles on Sustainable Hydropower Development in the Danube Basin”. The Workshop results will contribute towards the sustainability of hydropower development in the Danube River Basin and will ultimately feed into the Danube River Basin Management Plan Update 2027.



## SUSTAINABLE AGRICULTURE

Agriculture is an important component of the economy in many Danube countries since the geographical and climatic conditions in large parts of the Danube River Basin are favourable for agriculture. More than 50% of the basin territory are under agricultural cultivation. Agronomic conditions are especially favourable for maize (corn), soybeans, sunflowers and other thermophilic crops besides the ordinary cereals. In the Western regions agriculture plays a key role as local supplier of commodities that are further transformed into food (mainly milk and meat products, fruits and vegetables). In the Eastern regions agriculture is one of the most important employers in rural regions. However, water-related environmental concerns are also related to agriculture. Agriculture needs large amounts of clean water to satisfy the increasing demand for high quality food. Intensive agriculture may cause quality and quantity problems of surface- and groundwater by pollution, overabstraction and inappropriate land management endangering the status of the water bodies but also the sustainability of its own water resources. Across countries with diverse socio-economic situations, the demand for water from different economic sectors, including agriculture is on the rise. This intensifying competition for the use of water resources is exacerbated by climate change-induced droughts, making water scarcity an even greater concern, alongside water quality issues. To address these multi-dimensional challenges, agriculture and water management should be well aligned by coordinated strategies and joint actions to ensure the protection of water resources, the economic livelihood of the farmers and the production of high-quality food. However, at the regional scale of the DRB, a proper dialogue between the water and agricultural sector and coordinated policy tools

have not been fully established yet. To tackle this shortcoming, Danube countries agreed in 2016 to start, in close cooperation with the agricultural sector, a broad discussion process aiming at developing a sound guidance document on sustainable agriculture. Following this process, a Guidance Document on Sustainable Agriculture was published in the year 2021. The guidance document recommends sound policy instruments, financial programs and cost-effective agricultural measures to protect water bodies for decision makers in the agro-environmental policy field. It offers Danube countries support for the preparation and implementation of their tailor-made national agro-environmental policies, CAP Strategic Plans and relevant strategies of the River Basin Management Plans in good synergy. The recommendations provide the Danube countries with a framework to adjust their national agro-environmental policies towards decoupling agricultural development from increasing pollution and water scarcity. Achieving decoupling involves smartly adjusted irrigation, natural water retention and fertilization according to the soil resources available (water and nutrients) and the crops' yield demands. This way, Danube countries can optimize the use of soil resources and maintain the natural soil conditions, while ensuring desired food production, reducing the need of excess fertilization and irrigation, adapting to changing climate and societal demands, minimizing pollution into water and avoiding uncoordinated overuse of water resources. The ICPDR intends to continue and intensify the dialogue with agriculture focusing on key topics related to the decoupling concept and in the context of drought and pollution, in close cooperation with the national stakeholders and international actors such as the FAO.



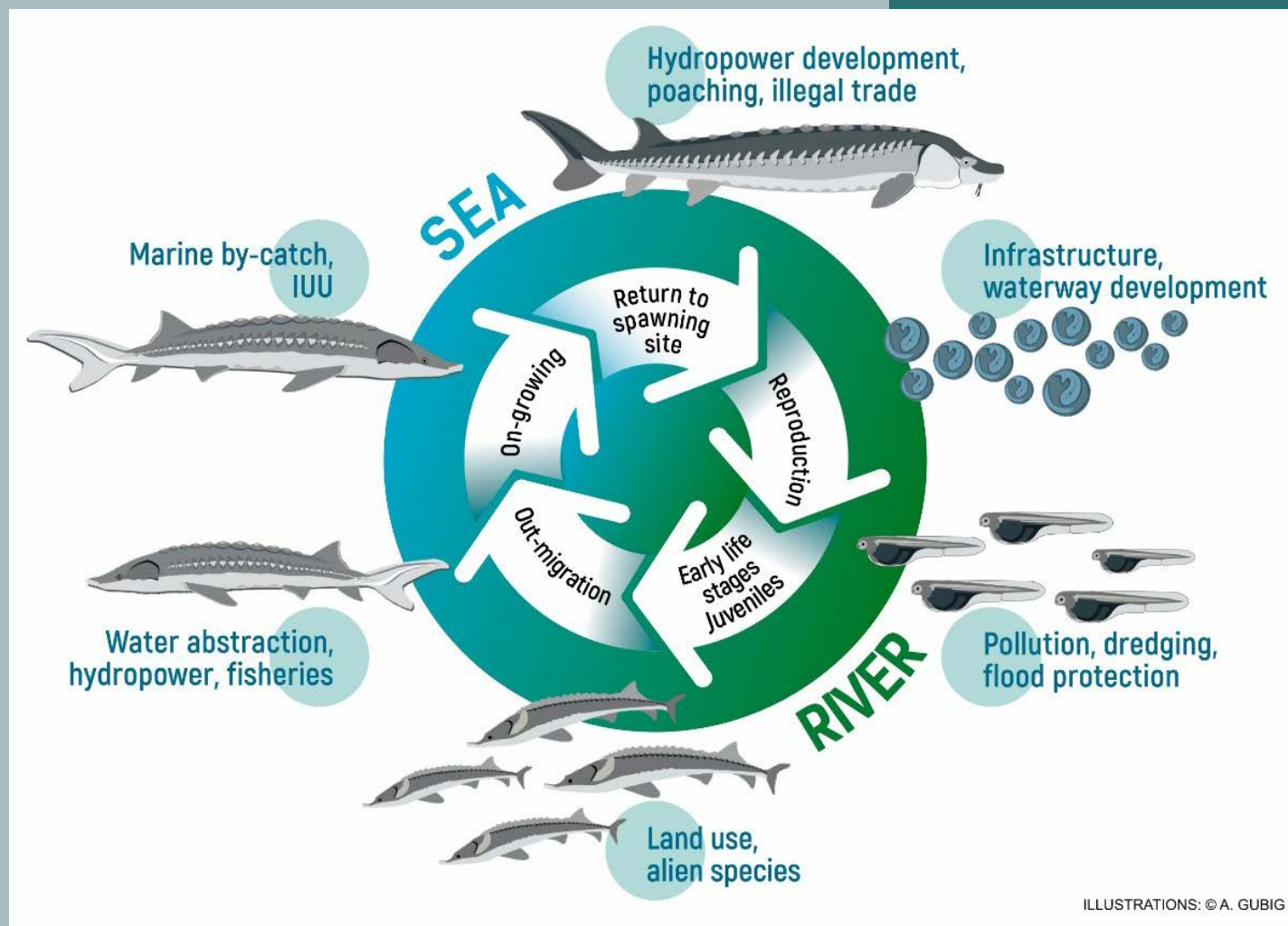
## 2.8 STURGEONS AS FLAGSHIP SPECIES AND INDICATOR FOR ECOLOGICAL STATUS OF DANUBE RIVER BASIN'S WATERS

Originating 200 million years ago, sturgeons are an ancient migratory fish which is today teetering on the brink of extinction. Until the 19th century, giant sturgeons migrated up the Danube as far as Regensburg on the Upper Danube and were important mainstays for many fishing communities. Large species, such as the beluga sturgeon, could grow up to seven metres in length, may travel more than 2,500 km to reach their spawning grounds and live up to 200 years. Although sturgeons have outlasted the dinosaurs, nowadays sturgeons have become the most threatened group of animals globally according to the IUCN Red List of Threatened Species.

IUCN's latest Red List update (2022) confirmed the local extinction of the ship sturgeon for the Danube Basin, with its disappearance from the Danube River it is lost for the EU territory and marks the sad and very rare event of a species going extinct despite its protection through the EU Habitats Directive. In addition, IUCN transferred the sterlet to a higher threat category. This means that out of the six historical sturgeon species native to the Danube three are listed as critically endangered (Danube/Russian sturgeon, stellate sturgeon, beluga sturgeon) and one is listed as endangered (sterlet), while the ship sturgeon and European sturgeon are already extinct in the Danube River Basin.

The factors driving sturgeons to extinction are manifold and range from historical legal over-exploitation to ongoing illegal fishing, bycatch and trafficking today (stemming from improper fishery management and insufficient legal enforcement of fishing bans), blocked migration routes through dams and loss or degradation of habitats to other negative pressures such as river modification or pollution induced fish kills.

Sturgeons depend on an interlinked network of habitats from rivers to the sea that provide them with suitable conditions to complete their life cycles, feed, disperse, repopulate, balance fish biomass and genetically exchange. The status of migratory fish is a parameter of the ecological condition and key indicator of the entire Danube River Basin. The Danube River itself forms the ecological corridor migratory sturgeons depend on, connecting the marine habitats in the Black Sea up to tributaries in the basin.



ILLUSTRATIONS: © A. GUBIG

**Figure:** Sturgeon life cycle. A typical life cycle of migrating sturgeons showing adverse impacts on the various life cycle phases. © WSCS & WWF





The Iron Gate Dams I & II, the Gabčíkovo Dam and in part the chains of hydropower plants in Austria and Germany represent significant migration barriers for fish. Migratory fish, such as sturgeons as flagship species but also shads and medium distance migrants such as nase or barbel are particularly affected, since they are prevented from moving up or downstream between their spawning grounds and areas used at other times in their life cycle.

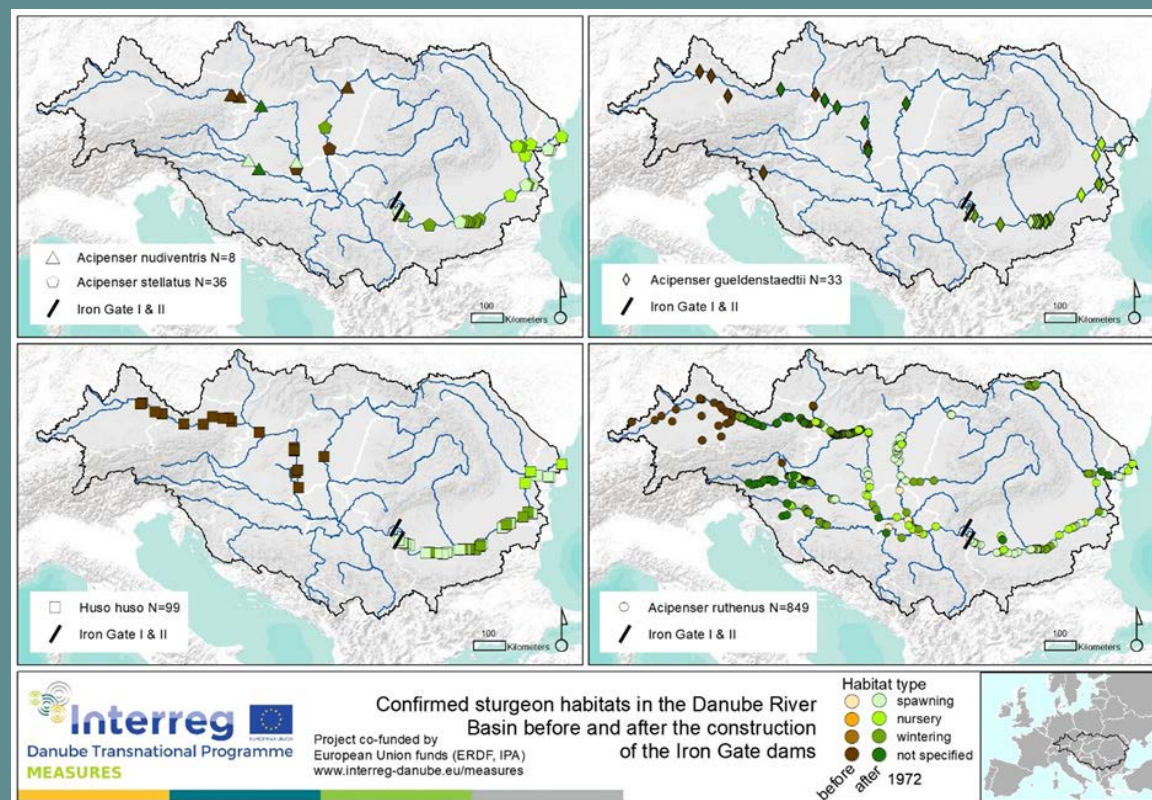
The ICPDR Sturgeon Strategy approved by the ICPDR in 2017 highlights the ICPDR's key competencies in Danube sturgeon conservation activities, such as supporting the restoration of lost and altered habitats, the prevention of further habitat degradation, measures to enable fish migration and improve water quality.

Sturgeon conservation efforts in the Danube River - Black Sea system require a basin-wide and interdisciplinary approach. Danube countries outlined key measures to avoid the extinction of Danube sturgeons in the Danube River Basin Management Plan Update 2021 including establishing ex situ broodstocks, reproduction and release programmes to save the genetic potential of sturgeon in the wild, continuing efforts at the Iron Gates to make this obstacle passable for sturgeons, effectively enforced multidecadal fishing bans, protection and restoration of habitats ensuring the integrity of migration corridors, monitoring and control of by-catch in marine and freshwater fisheries and the set-up of a basin-wide population monitoring. Due to their late sexual maturity, the remaining sturgeon population can only recover slowly and thus require not only urgent but also sustained long-term action.

When it comes to the need for functioning habitats and migration corridors for sturgeons and other migratory fish, close linkages can be seen in the efforts of Danube countries to improve the hydromorphological conditions of Danube River Basin's water bodies as well as to ensure the monitoring of the effectiveness of related measures as outlined in chapter 2.2.

## MEASURES PROJECT

The MEASURES Project (2018-2021) aimed to create ecological corridors by identifying key habitats and initiating protection measures along the Danube and its main tributaries. A map and database were developed, including information on geographical locations of sturgeon habitats in the Danube and its tributaries. Habitats were separated in observations before and after the construction of the Iron Gate dams (i.e. before/after 1972). Some recordings date back to the 15th century. Habitat types identified include spawning habitats, nursery habitats, wintering habitats, feeding habitats.



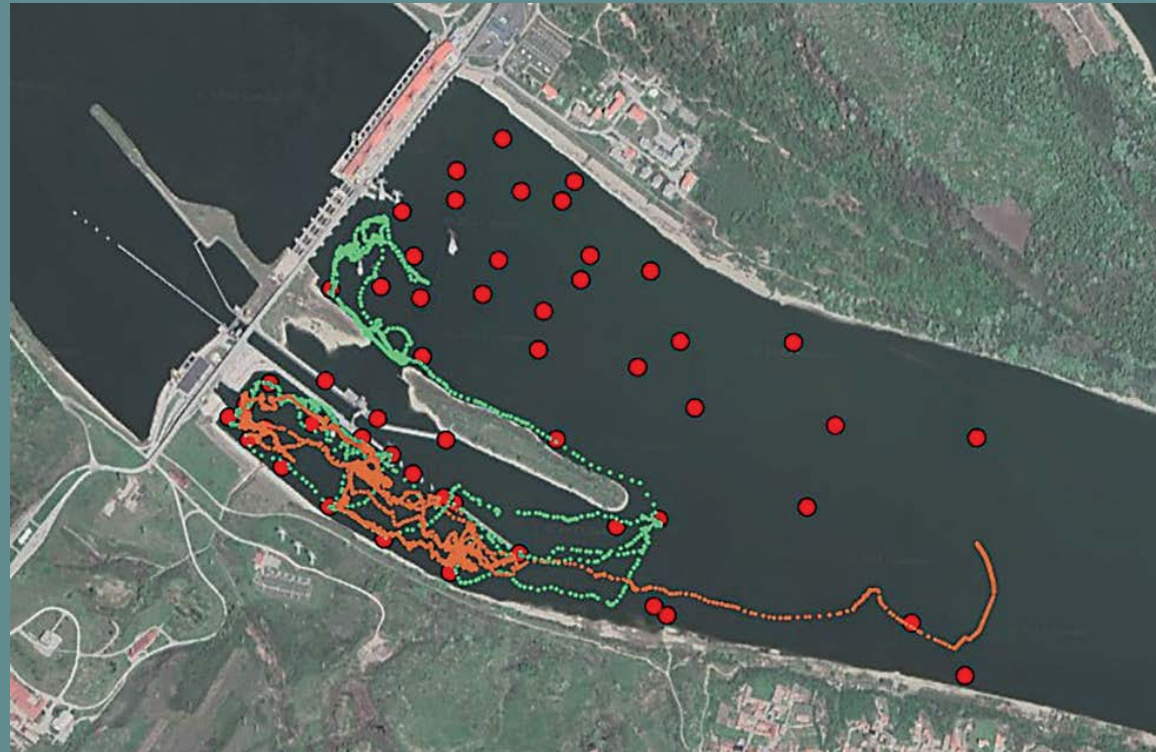
**Figure:** Confirmed Sturgeon Habitats in the Danube River Basin before and after the Construction of the Iron Gate dams (Outcome of MEASURES Project, Interreg, Danube Transnational Programme, co-funded by European Union funds (ERDF, IPA), as of August 2020)

An ongoing EU Service Contract (ENV/2022/OP/0019) to support the implementation of the “Pan-European Action Plan for Sturgeons” (PANEUAP) is further building on the habitats data aggregated in the MEASURES project, by expanding the approach to other European rivers. It will provide an assessment of the status of implementation towards the PANEUAP for 18 countries in Europe, including ten of the Danube Basin. Further deliverables (available at the end of the year 2024) under this contract are technical guidelines for population and habitat monitoring, ex situ programmes and a study on bycatch and will offer relevant guidance for implementation in the Danube basin.

Saving the Danube sturgeon species is a truly multi-level governance challenge which will require the involvement of many different sectors and authorities at different administrative levels, stakeholders and civil society. Effective action requires coordination of action between different territorial jurisdictions and the relevant international organisations and authorities. The ICPDR and its Contracting Parties are committed to playing a crucial role by maintaining dialogue and discussion with other key actors. In this regard, Danube Ministers emphasised in the Danube Ministerial Declaration 2022 *“the significant potential for synergies with the EU Water Framework Directive, and the EU Biodiversity Strategy for 2030, especially with regard to the targets on protected areas, restoration and species/habitats conservation improvement and stresses the need to strengthen cooperation with nature protection authorities.”*

## WE PASS 2 PROJECT

In March 2021, the European Commission (DG ENV) commissioned the ‘Pilot Project: Making the Iron Gate Dams passable for Danube Sturgeon’ (acronym WePass2) to conduct a feasibility study analysing the options to establish fish migration at the Iron Gate that includes (a) the study of alternatives for up- and downstream fish passage restoration at both Iron Gate dams, (b) a preliminary design of fish passes comprising all their technical elements, and (c) a cost estimate for the construction of the fish passes. As for the monitoring of migratory fish in the Iron Gate area, acoustic telemetry was used to track fish movements and migrations (see figure). Monitoring results helped identifying potential areas for fish passes downstream of Iron Gates II and



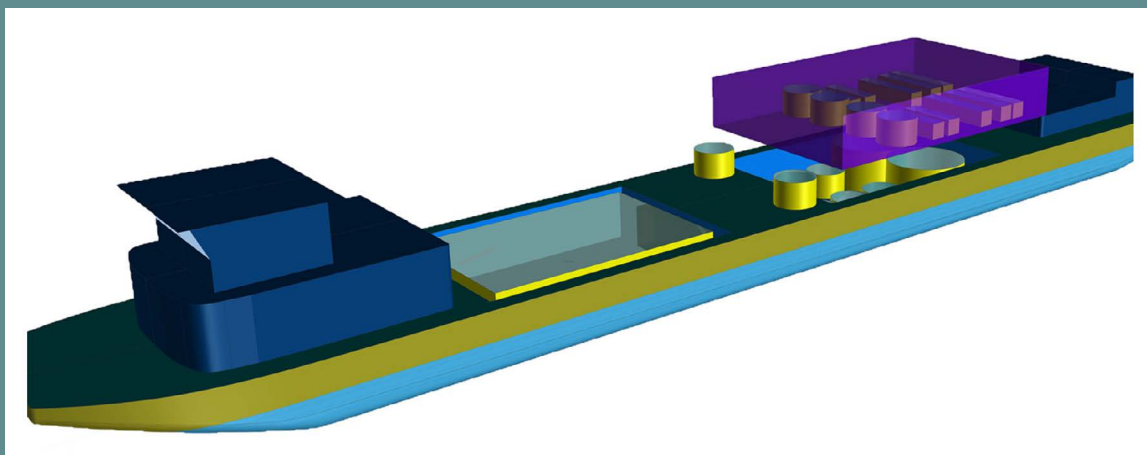
in the Gogoşu branch, proved fish movements in/through the reservoir between Iron Gates I and II, as well as distribution of fish downstream of Iron Gates I. The WePass2 project was finalised in September 2024. The Iron Gate Hydropower and Navigation System is one of the largest river engineering projects undertaken in Europe, with the dams mainly built to provide hydropower and flood protection, and to facilitate navigation along the Danube. Ensuring passage opportunities for fish at the Iron Gate dams is considered to be of major importance for the conservation of migratory fish populations in the Danube River basin. Restoration of river continuity at these sites would reopen an additional 900 km for migration up to the Gabčíkovo dam, providing suitable habitats and spawning grounds along the Danube and its tributaries.

**Figure:** Movement of one sterlet (orange line) and one vimba bream (green line) in the area under Iron Gate II dam. Red dots are location of acoustic receivers.



## LIFE BOAT4STURGEON

This project aims to establish a living gene bank for the remaining four sturgeon species in the Danube River Basin and strengthen the wild fish population by introducing young fish from the project hatcheries to the habitat. Within the project, the "LIFE-Boat 4 Sturgeon", a floating hatchery in the Danube in Vienna (Austria) will be established to keep and reproduce broodstock and rear juveniles. In addition, a similar facility for fish broodstock will be built along the Koros (Hungary) to minimise risks. A hatchery container will be installed on the Mur's riverbank (Slovenia)



**Figure:** Visualisation of the floating hatchery in the Danube in Vienna (©Spranger), <https://lb4sturgeon.eu/>



Danube Ministers expressed their support for sturgeon conservation activities in the Danube Ministerial Declaration 2022 by highlighting the cooperation with the Danube Sturgeon Task Force and with a view to contributing to the implementation of the Pan-European Action Plan for Sturgeons. Danube Ministers welcomed *"the progress made in the assessment of possibilities for opening fish migration routes at the Iron Gate dams"* and emphasized *"the need for ensuring the necessary financial resources for the implementation of technically and economically feasible solutions"* as well as *"the need to discuss sturgeon migratory routes and habitats upstream of Iron Gates as soon as passability of Iron Gates will be foreseeable."*

The upcoming Joint Danube Survey (2025) will integrate sturgeons as a focus topic, using eDNA methods, and further adding additional information on sturgeon habitats, about which little is still known. The monitoring of sturgeon habitats is crucial for understanding the dynamic interactions between sturgeon populations and their environment. It involves identifying key habitats, observing sturgeon use patterns, and gaining a comprehensive understanding of the habitat functionality. Ultimately, continuous monitoring of sturgeon populations and their habitats is indispensable for evaluating and confirming the potential success or shortcomings of sturgeon conservation objectives. A dedicated JDS5 Sturgeon Expert Group is established to coordinate sturgeon population monitoring activities and – together with the ICPDR HYMO TG – to liaise on sturgeon habitat assessment activities in the frame of the JDS5 in the year 2025.

Sturgeons are exceptional flagship species for ecologically healthy rivers connected to seas due to their size, longevity, diverse habitat utilization and their migratory life cycle that connects coastal waters to the upper reaches of riverine ecosystems. The conservation and protection of sturgeon populations need a sustained long-term holistic approach, connecting international waters, coastal areas, and often multi-national river systems, and require a secured and long-term funding of priority conservation measures in order to suit these long-lived species.

## 2.9 WATER AND ECONOMICS

**The EU Water Framework Directive (EU WFD) is the first environmental Directive that gives a prominent role to economic approaches in its implementation. The EU WFD explicitly refers to an economic analysis and includes the use of economic instruments such as environmental charges and taxes. This rationale is grounded on the polluter pays principle and acknowledges the reliability of economic tools in the process of properly assessing the mitigation of environmental pressures.**

The EU WFD stipulates in its first recital that “Water is not a commercial product like any other but, rather, a heritage that must be protected, defended, and treated as such”, underlining the importance of prioritizing the protection and sustainable management of water resources over purely commercial interests. In this respect, the water pricing policy becomes a fundamental consideration in ensuring a sustainable water resource management.

The EU WFD includes the following economic provisions: Article 4 addresses the most efficient integrated measures to help achieve the water bodies related environmental objectives. Article 9 addresses the consideration of cost recovery principle, encompassing environmental and resource costs, to ensure that water-pricing policies provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives of the EU WFD. The approach of the “polluter pays principle” is applied within water pricing policies in most of the Danube countries supported by legal instruments.

Investments in the water management sector (such as drinking water supply and collection and treatment of waste water) were already in place before the adoption of the EU WFD in the year 2000. However, with the adoption of the EU WFD acting as an umbrella Directive to boost the implementation of other water related Directives (such as the EU Urban Waste Water Treatment Directive, EU Groundwater Directive, and the EU Nitrates Directive), measures to achieve environmental objectives in Danube countries were intensified on national level.

The EU WFD implementation, and the financing of the Joint Programme of Measures, requires adequate ways of financing. It is a national responsibility and as such, the financing of measures is the responsibility of each national government, as well as private owners and operators of facilities. Important funding sources for water management in the Danube River Basin are EU funds, complemented by national, regional and local public funds, and water and sanitation tariffs (reflecting that several countries still need significant investments in drinking water and wastewater treatment infrastructure). Economic tools such as the cost effectiveness analysis or the cost benefit analysis support the decision-making process for the implementation of planned measures.

EU-supported funding programs for EU MS as well as non-EU MS are available for specific measures. This is particularly important for relatively young EU MS which will clearly rely upon EU funding for measures addressing wastewater treatment, agriculture and hydromorphological alterations.

In the Danube Declaration 2022 Danube Ministers committed “to make all efforts to ensure national actions and to mobilize all necessary resources in support of the implementation” of the Joint Programme of Measures.

The investment value of the EU WFD Joint Programme of Measures implemented from 2009 to 2021 and estimated from 2022 until the year 2027 by Danube countries amounts to 92,7 billion EUR across the entire Danube River Basin.

Out of the total of 92,7 billion EUR, and following the different EU WFD cycles, the investment value was reported with 27% spent in the 1st EU WFD cycle, 24% spent in the 2nd EU WFD cycle as well as 49% of the total EU WFD investment value estimated to be spent in the 3rd EU WFD cycle.

The total EU WFD investment figures for the 1st EU WFD cycle (2009-2015) and 2nd EU WFD cycle (2016-2021) are investments “spent”, while those for the 3rd EU WFD cycle (2022-2027) are investments “estimated/planned”.<sup>\*</sup> Data reported refers to the Danube River Basin, with the exception of SI and ME which only had data available for the entire country.

The majority of Danube countries reported data for all three WFD cycles. However, it is important to mention that Danube countries, which accessed the EU only after the year 2009 (like Croatia in the year 2013), or which are non-EU-Member States (such as BA, RS, MD, ME and UA), started the preparations of the RBMPs only at a later stage. That is why BA reported data for the years 2016-2022 as well as 2022-2027; ME, MD and RS reported data for the years 2022-2027. UA provided data for the years 2025 to 2030.

Data and information on financing aspects of EU WFD related measures are heterogeneous across Danube countries in terms of structure, scale, or both the amounts available from different funding sources and the time horizons considered. The different approaches of assessing investments in the water sector in the Danube countries make it difficult to provide a comparable assessment of individual investment efforts across the Danube River Basin countries.

Financial costs related to the implementation of the EU WFD are structured according to the relevant Significant Water Management Issues (SWMIs) or economic sectors (e.g., industry, agriculture) identified at national level, e.g., referring to water pollution or hydromorphological pressures.

<sup>\*</sup>Bulgaria has reported the spent financial costs for the first and second EU WFD cycles, and preliminary estimated costs for the EU WFD cycle focusing on the years 2022-2027 due to the later finalization of the 3rd national RBMP.



The planned budget for the implementation of relevant measures for the third EU WFD cycle 2022 to 2027 can be indicated as planned financial costs for all Danube countries.

It is important to mention that the value of the Joint Programme of Measures does not always include investments necessary for monitoring, inspection, and/or reporting. These are essential for the implementation of the EU WFD as well. Investments of polluters are also not captured, although in several cases, these are significant amounts that are invested by the private sector to improve the industrial processes but also contribute to improve the water quality.

Some countries along the Danube estimate the EU WFD investment costs associated with achieving compliance with the EU WFD beyond 2027. It is important to note that measures planned, but not executed during the current cycle of the WFD, were/will be carried over to subsequent cycles for implementation.

Most Danube countries estimate capital expenditures of planned measures in their RBMPs. The knowledge base on costs of planned measures is, however, heterogeneous. The cost estimations for measures included in the update of the DRBMP are basically partial, covering mainly capital investment costs while lacking corresponding estimates of annual operational and maintenance costs.

Successfully implementing the Joint Programme of Measures and achieving "good status" of the water bodies in the Danube River Basin require adequate financing strategies. Besides the main key funding programs like ERDF, ESF+, CF, EMFF, EAFRD, utilizing funds from other EU programs like CAP, or LIFE has been common practice and is anticipated to continue in addressing specific problems and implementing necessary measures. In this respect, the DRBMP Update 2021 summarises a set which financing source/program have been used by Danube countries for measures related to the identified Significant Water Management Issues (SWMIs) and related measures in the last EU WFD implementation cycle.

The **Austrian „Environmental Promotion Act“ (UFG)** regulates the support of measures to protect the environment and amongst others the support of renewable energy. In terms of water management, it is the basis for promotion of measures in favour of municipal drinking water supply, wastewater disposal and water ecology. Eligible are measures e.g., for the restoration of the continuity of watercourses or for restructuring of morphological modified watercourses. Since 2020, additionally 200 million EUR are provided for measures for the improvement of ecological water status. The Austrian „Waterworks Promotion Act“ (WBFG) is the legal framework for water construction from federal funds e.g. for the purpose of water supply, wastewater disposal, the improvement of water balance, flood protection, regulation or protection of surface waters and groundwater.

The **Bavarian Program for the Promotion of Water Management Projects** specifically supports measures for aquatic habitat restoration. Around 4 million EUR are invested annually for natural watercourse maintenance and expansion, focusing on smaller watercourses managed by municipalities in Bavaria. The funding supports municipalities from planning to implementation, covering up to 90% of the costs, including land acquisition. Additionally, exemplary projects are awarded every two years and publicly announced.

The winners of 2023 can be viewed at [www.lfu.bayern.de/wasser/gewaessernachbarschaften/baechewettbewerb/wettbewerb\\_2023/index.htm](http://www.lfu.bayern.de/wasser/gewaessernachbarschaften/baechewettbewerb/wettbewerb_2023/index.htm) (in German).

### 3. Price 2023: Trubach in Obertrubach



Before Measures



After Measures

In 2018, the **World Bank (WB)** produced a detailed **“Romanian Water Diagnostic Report”**, offering a comprehensive overview of the Romanian water sector in 2017, a decade post-EU accession, highlighting advancements in water resource management and water supply and sanitation services alongside persisting challenges in EU Water Framework Directive compliance and universal access to piped water supply and sanitation services, and water security. Among other issues, the report pointed out that management and financing of hydraulic assets – dams, flood management infrastructure, irrigation etc. – needs rethinking. Given this context, the National Administration Romanian Waters (NARW) approached the World Bank to seek technical support towards strengthening “its” economic mechanism for sustainable financing of water infrastructure in Romania. Two components define the agreement between of RO and WB as following: Development of a sustainable financing approach towards ensuring operation, maintenance and development of water infrastructure as well as enhancing revenue and costs management, including improvement of information and monitoring processes. The advisory services delivered by the World Bank under this project support the Government of Romania, through NARW to successful develop the management and financing of hydraulic assets in the country through an efficient and sustainable economic mechanism.

**As for the assessment of financing needed for the implementation of the EU WFD the following key messages can be highlighted:**

- Significant investments were made by Danube countries in water supply and municipal waste water treatment services. In the last fifteen years, Danube countries have invested ca €28 billion in wastewater infrastructure in line with the requirements of the UWWTD and the WFD (DRBMP Update 2021).
- Measures related to hydromorphology show a consistent upward trend. The implementation of HYMO measures has significantly benefited from substantial financial investments in this area, from national budgets but also from EU & non-EU Member States financing programs. In addition, several good cases of restoration projects are documented by non-governmental organizations.
- The success of the implementation of the EU WFD is not strictly tied to the timeframe associated with EU WFD implementation cycles. Significant investments, particularly in water and wastewater infrastructure, were made prior to the entry into force of the EU WFD.
- In particular young EU Member States heavily rely on EU supported funding programs, particularly with regards to measures for drinking water supply and municipal wastewater treatment.
- For non-EU Member States funding is more challenging due to absence of Cohesion Funds which are only available to EU Member States.
- Managing complex application procedures and developing feasible project proposals for funding of the Joint Programme of Measures necessitates enhanced institutional capacity.





## 2.10 DANUBE TOGETHER: A SHARED VISION THROUGH PUBLIC ENGAGEMENT

**At the core of the ICPDR’s mission lies the principle of public participation, enabling every Danube River Basin resident to have a say and actively contribute to restoring and preserving our vital water resources for future generations, ensuring the sustainable use of the Danube’s water resources.**

**At the heart of the ICPDR’s mission is a commitment to harnessing the collective power of all the citizens in the Danube River Basin. It’s about amplifying voices, encouraging active participation, and ensuring the rejuvenation and safeguarding of our invaluable water resources for generations to come. Our ultimate goal is to promote the sustainable use of the Danube.**

The ICPDR firmly believes that for the mission to succeed, the ICPDR must bring all stakeholders directly into the fold. This means fostering an environment where civil society and the wider public can engage meaningfully in our initiatives. To this end, the ICPDR places a strong emphasis on public information, awareness-raising, education, and outreach. Why? Because the ICPDR recognises that active public participation leads to deeper understanding, more comprehensive policy support, and greater efficiency in implementing our management measures. In essence, it’s an investment in decision-making that yields more widely accepted, implementable, and sustainable solutions.

The role and scope of responsibilities undertaken by the Public Participation (PP) Expert Group stand out. The ICPDR complements and amplifies the work of our fellow ICPDR Expert and Task Groups in order to translate the complex work of the ICPDR into accessible information for the broader public.

**The public participation work of the PP EG revolves around three core objectives:**

**INFORM:**  
The ICPDR aims to make information readily available, ensuring transparency and accessibility to all.

**CONSULT:**  
The ICPDR actively seeks input from our stakeholders, valuing their perspectives and including them in our decision-making processes.

**INVOLVE:**  
The ICPDR goes beyond consultation by demonstrating our sincere desire to have all individuals on board, valuing their input and opinions as the ICPDR charts the course ahead.

Both motto suggestions encapsulate our commitment to unity and the active involvement of all stakeholders in shaping the future of the Danube River Basin.

### • **BASIN-WIDE INITIATIVES:**

*We INFORM: Sharing Knowledge and Stories.*

The ICPDR utilises various channels:

- Danube Watch – a print magazine that has become a digital newsletter
- The ICPDR website serves as a hub for news, press releases, updates on developments, events, and key activities. It’s also where the ICPDR publishes brochures, reports, and documents and grant access to databases and technical reports like the TNMN year-books
- The ICPDR Social Media Channels’ launch in 2019 has further emphasised the importance of delivering concise, bite-sized, relevant information.

### **Let Us Explain! Public Consultation and Engagement:**

Under the banner of “Let Us Explain!” the PP EG actively engaged in the public consultation process for the 2021 updates of the Danube River Basin Management Plan (DRBMP) and the Danube Flood Risk Management Plan (DFRMP). Following the PP EG’s 3-level public consultation process (active involvement, consultation, and information), this initiative included offline and online activities that strengthened our connection with the broader public.

A key component of this initiative was an online questionnaire, available in 11 Danubian languages (English; Bulgarian; Croatian; Czech; German; Hungarian; Romanian; Serbian; Slovak; Slovenian; Ukrainian.) The questionnaire sought to identify knowledge gaps in the public’s understanding of the two management plans, educate the general public, gauge their satisfaction, with the proposed measures, and determine their priorities regarding climate change prevention, flood risk management, as well as other related activities.

The online questionnaire was available on ICPDR.org from April through September 2021, and was targeted at interested but less informed members of the public. A total of 350 individuals started the questionnaire, with 232 completing it in full. These findings highlighted a need for greater public understanding of the management plans, which led to the creation of two new brochures that presented the plans in a clearer, more accessible format. The initiative successfully raised awareness of the plans and boosted public participation in the consultation process.

### *We CONSULT: Involving Stakeholders*

The ICPDR actively supports stakeholder and civil society involvement across all levels of its work, particularly in the development of the Danube River Basin Management Plan and the Flood Risk Management Plan. This commitment ensures that diverse voices are incorporated and represented into decision-making processes, thereby fostering transparency, collaboration, and shared responsibility.

The Stakeholder Consultation Workshop, Our Opinion – Our Danube, was a 1,5 day (online) event hosting more than 200 participants from across the Danube region. The workshop provided a dynamic platform for representatives from government, NGOs, academia, and

civil society to engage directly in shaping the future of water management. This workshop exemplified the ICPDR's commitment to inclusive and transparent governance, allowing an opportunity for stakeholders to co-create solutions and contribute to long-term strategies for the Danube River Basin.

### We INVOLVE: Broadening Engagement

One of the key roles of the Public Participation Expert Group is to provide insights into ICPDR's work and engage a broad spectrum of society, extending beyond the ICPDR community. This consultation work fosters broader support for policies and enhances the efficiency of implementation measures.

To include the general public beyond traditional stakeholders, a social media campaign was launched during the Public Consultation Process, with an additional focus on the Stakeholder Consultation Workshop. The campaign featured engaging "factoids" on water management and several calls-to-action to participate in the Online Questionnaire and Workshop. In a 14-day period around the workshop (June 20 – July 3), the campaign generated nearly 10% of its total impressions (27.5k) and used the hashtag #OurDanube 131 times. Between March 31 and September 30, 2021, the campaign resulted in 59 new Twitter followers, 143 new Facebook followers, 63 new Instagram followers, 13,033 interactions, and over 300,000 impressions.

### Mobilizing Public Engagement: Climate Change

Climate change is a topic that can galvanise public engagement. The ICPDR is in the early stages of implementing strategies to adapt to climate change in the Danube Basin. This includes improving forecasting and warning systems, adopting ecosystem-based approaches, promoting water-saving behaviours, and exploring new policy approaches. A summary report on droughts and low water levels in the DRB was drafted this summer. With floods being an issue on which public comprehension remained limited, the PP EG has intensified efforts to communicate about floods and other extreme weather events. As climate change concerns grow, the PP EG has a renewed mandate to address these issues. Moreover, the aforementioned questionnaire responses demonstrated significant interest in climate change, which was frequently mentioned by stakeholders. As a result, climate considerations were incorporated into the 2021 DRBM Plan Update.

### • HIGHLIGHTS FROM THE DANUBE COUNTRIES:

**Social Media Country Takeover:** in 2019 to mark the First Anniversary of the ICPDR social media presence, the social media project: 'Country Takeover' was launched. For one week out of every calendar month, representatives from one of our 14 member countries and the EU do a 'takeover' of the ICPDR social media accounts (Facebook, Twitter, LinkedIn, and Instagram). As a result, country-specific content is published on the ICPDR's social media channels. The ICPDR has refined the concept over the past three rounds to become increasingly interactive. Such posts have yielded the most significant engagement and led to a visible increase in our analytics on all ICPDR's social media accounts.



Picture: Danube Day – children getting active for a cleaner river ©BMLFUW/belle & sass



**Danube Watch:** One of the ways the ICPDR disseminates information in the Danube River Basin about the Danube River Basin is through Danube Watch under the motto 'The Magazine for the Danube River'. This serves as a platform to convey updates on country-related projects – not exclusively, of course – and features key actors in the countries and activities packaged in compelling stories.

**ICPDR Website:** Our website is a hub for sharing information, featuring news, press releases, and the latest developments, events, and key activities. The website was relaunched in the summer of 2023. It is also used as a repository for online resources for all our content such as brochures, reports, and documents. The ICPDR also provides access to databases and technical reports, including the TNMN yearbooks.

**Getting the Youth on Board:** The ICPDR places a strong emphasis on youth engagement, making it a top priority in our agenda. Many of our public activities such as: **Danube Day**, the **Danube Box**, and the **Danube Art Master Art Competition** are designed to actively involve and inspire young people across the Danube region. Since June 2024, the Danube Youth Council (DYC) has become an ICPDR Observer organization. Established in October 2022, the DYC serves as a platform for institutional youth involvement within all EUSDR bodies, ensuring that young people's ideas and perspectives have representation at a political level. With 28 members representing each of the 14 countries in the Danube Region, the DYC brings a valuable youth perspective to support the ICPDR's mission.

**Danube Day:** Celebrated annually on June 29th since 2004, Danube Day is a unique event involving all 14 countries in the Danube Basin to honour Europe's remarkable river system and the life it supports. An integral part of Danube Day is the Danube Art Master competition, which invites schools to organise field trips to the Danube or its tributaries and create environmentally themed artwork. Jointly organised by national governments and NGOs, this competition has enjoyed overwhelming success and just celebrated its 20th anniversary in 2024.

**Danube Art Master:** The annual Danube Art Master competition has been a remarkable initiative that brings the beauty and significance of the Danube River to school pupils and young individuals across the Danube River Basin. This competition holds a special meaning as it introduces millions of young individuals to the importance of their shared waters, culture, and creativity. As the flagship international environmental art competition for children and young people in the Danube region, Danube Art Master offers the youth of the Danube River Basin an opportunity to explore the health of their local rivers, and reflect on their role in preserving these vital waters for future generations. It encourages children to step out of the classroom, immerse themselves in nature and express their creativity through art inspired by their natural surroundings.

Over the period 2021 – 2024, an annual average of 400 art works were submitted to this contest, showing the enthusiasm and dedication of young artists to raise awareness about the Danube's environmental and cultural significance.

In 2024, the ICPDR celebrated the 20th anniversary of this beloved competition, showcasing the incredible journey of Danube Art Master over the years. This milestone was celebrated with a special exhibition held from 20-26th June 2024, at the iconic location of



Hviezdoslav Square in the old town of Bratislava. The exhibition featured a wide array of artworks that celebrated the beauty and significance of the Danube River. Participants from all ICPDR countries presented their unique perspectives through paintings, sculptures, and multimedia pieces, all inspired by the theme of protecting and preserving the Danube. The response from the public was overwhelmingly positive, with many visitors expressing their admiration for the talented young artists and the important message their works conveyed. The event not only highlighted the artistic talents within our community but also underscored the critical importance of environmental stewardship.

**Danube Box:** was an education toolkit available in various languages and country versions that equips teachers with resources to engage younger generations with Danube-related themes and issues. This is planned to be revamped in 2025.

**Ministerial Danube Declaration 2022:** Every six years, an updated 'Danube Declaration' is signed and adopted by ICPDR contracting parties, updating and extending the objectives and direction of travel for the River Basin. It's a vital part of political commitment to strengthen the ICPDR's goals for improving and maintaining the Danube River Basin. Every Danube Declaration so far has highlighted the significance of the ICPDR as a coordinating mechanism within the basin for matters of transboundary water management – but each one also brings new issues to the table and revises old approaches for the future of transboundary water management.

The PP EG has played a role in streamlining the Ministerial Danube Declaration 2022 messages, making them more accessible to a broader audience and increasing its resonance.

**Partnerships and Cooperation:** The ICPDR actively promotes partnerships and collaborates with the private sector to address the diverse challenges in the Danube Basin. A recent example is the 2023 partnership with Erste Group Bank (EH), emphasising the po-

tential for private-sector collaboration to align corporate activities with the goals of the Danube River Protection Convention.

**Joint Danube Survey 4 (JDS4) Communications:** What made JDS4 truly transformative was the significant contribution of the Public Participation Expert Group (PP EG) to its communication efforts.

In 2020, the PP EG introduced the engaging and inspiring motto, 'Discover Danube,' which profoundly impacted the project's ability to connect with a broader audience. This motto captured the essence of the JDS4 and encouraged active public participation and enthusiasm for understanding the Danube River. The PP EG's innovative communication strategies, built around this motto, succeeded in making the vast and complex scientific data more accessible and relatable to the public.

By distilling complex scientific findings into engaging narratives and initiatives under the 'Discover Danube' banner, the PP EG enabled a broader audience to appreciate the significance of the JDS4 and the vital role of the Danube River in our lives. Through these efforts, the PP EG significantly enhanced the project's information impact, fostering a sense of ownership and pride among the public for the Danube River and its protection.

The outreach efforts of JDS4 truly highlight the mutual benefits of closer collaboration between science and communication staff. Engaging the public in the Danube River Basin was vital, involving intensive outreach to disseminate JDS4 news to stakeholders and the wider public. It was essential to be able to convey why their river matters and invite them to get involved in JDS any way they feasibly can, which fostered a deeper connection and commitment to the Danube's health and longevity.

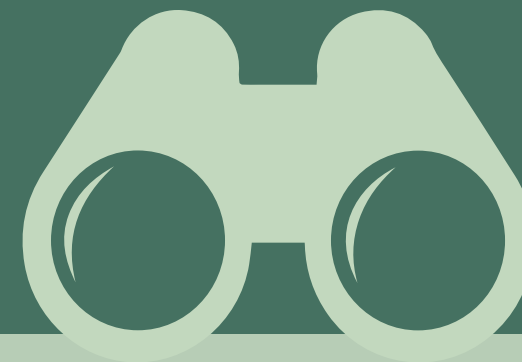
**Danube Fauna, Flora, and Sturgeons:** the Public Participation Expert Group (PP EG) has been diligently focusing its efforts on fostering a deeper connection between the Danube River Basin's remarkable fauna, flora, and its inhabitants. With the advent of the ICPDR Sturgeon Strategy and Sturgeon Communication Strategy, the PP EG has actively pursued initiatives to celebrate and conserve the Danube's biological treasures.

One noteworthy initiative has been the creation of educational materials like fish cards and the pocket-sized guide 'Danube in Your Pocket.' This compact, foldable map serves as an informative and visually captivating gateway to the astounding aquatic biodiversity thriving within the Danube River Basin. Designed with the aim of engaging and educating the general public, these deliverables have proven instrumental in bringing to light the extraordinary variety of flora and fauna that make the Danube ecosystem their home and to inspire awareness and action toward a healthier, more sustainable Danube ecosystem.





### 3. CONCLUSIONS AND OUTLOOK



Reflecting accomplishments and progress made together by Danube countries over the past years, this Interim Report on the Implementation of the Joint Programme of Measures in the Danube River Basin as prepared by the ICPDR showcases measures related to surface water pollution and hydromorphological alterations, addresses groundwater pollution, describes monitoring activities and measures related to the effects of climate change, outlines the inter-sectoral cooperation and highlights sturgeon conservation activities. This chapter summarises the main outcomes and addresses the gaps and challenges to be further closed and addressed in the coming years of WFD implementation in the Danube River Basin.

The **measures addressing pollution** have substantially contributed to the reduction of pollutant inputs into surface waters of the DRB but further efforts are still needed. Some of the Danube countries are lagging behind with the implementation of relevant EU Directives. Moreover, Danube countries are facing challenges since the water management related EU legislations are currently revised in line with the EU Green Deal and its related strategies such as the Zero Pollution Action Plan. While keeping the environmental and climate objectives ambitious, the revision process will bring challenges for water management by tightening the requirements and/or extending the scope of the water-related regulations for inter alia urban wastewater treatment, industrial technology implementation and pollution control, integrated pest management, agricultural measures, monitoring of priority substances and good chemical status. The water management sector has to adapt its policies and measures to reflect to these requirements and to establish a regulatory framework that can enable and control the im-

plementation of these policies. In addition, in some Danube countries, substantial lack of institutional capacity, unclear responsibilities and insufficient intersectoral dialogue hinder the establishment of an efficient management. In total, 20 million PE (24% of the basin-wide PE) need basic infrastructural development; connection to public sewer systems and biological treatment needs to be ensured for 9 million PE, whereas 11 million PE need to access to collection system and tertiary treatment. Further efforts should be made to foster the development of investment projects in the wastewater sector. Supporting non-EU MS to find appropriate financial sources and to achieve progress is still a challenge in the DRB and should be further facilitated. Capacity building is necessary for both, the national/local administration and the utility operators to strengthen their management and technical skills and to improve financing, operational, and technological aspects of the wastewater infrastructure and services.

The implementation of water-related measures addressing land management has a high importance since significant amounts of nutrients stem from agricultural fields. Danube countries need to better align water and agricultural policies and to seek synergies between River Basin Management Plans and CAP Strategic Plans in order to decouple agricultural development from nutrient pollution and prolonged water shortages. Efforts are needed to ensure available financial instruments and to appropriately finance agricultural measures that go beyond legal requirements with additional positive effects on environment.

Narrowing the information gap related to hazardous substances pollution is a key aspect. The state-of-the-art knowledge regarding monitoring and chemical emissions needs





to be significantly improved. Further efforts are needed to identify the emission sources of priority substances and other emerging chemicals of basin-wide relevance. In particular, the lack of high-quality monitoring data on emerging chemicals of high importance in wastewater effluents have to be addressed. In addition, diffuse emissions and pathways should be further assessed by regionalized modelling. A comprehensive inventory on hazardous substances is needed to get a better understanding on inputs and fluxes of hazardous substances in the DRB.

One of the key conditions towards tackling plastic pollution is to establish a proper waste management system to avoid illegal and uncontrolled waste deposits. This needs to be accompanied with an enabling regulatory framework, support for innovation and recycling, adequate plastic pollution monitoring and river clean-up activities. In addition, behavioural change, education and raising awareness of the public are essential aspects towards a more responsible and sustainable use of plastics. While priority should be given to reducing plastic pollution at source, river clean-up actions are also highly important to eliminate plastic litter accumulation hot-spots.

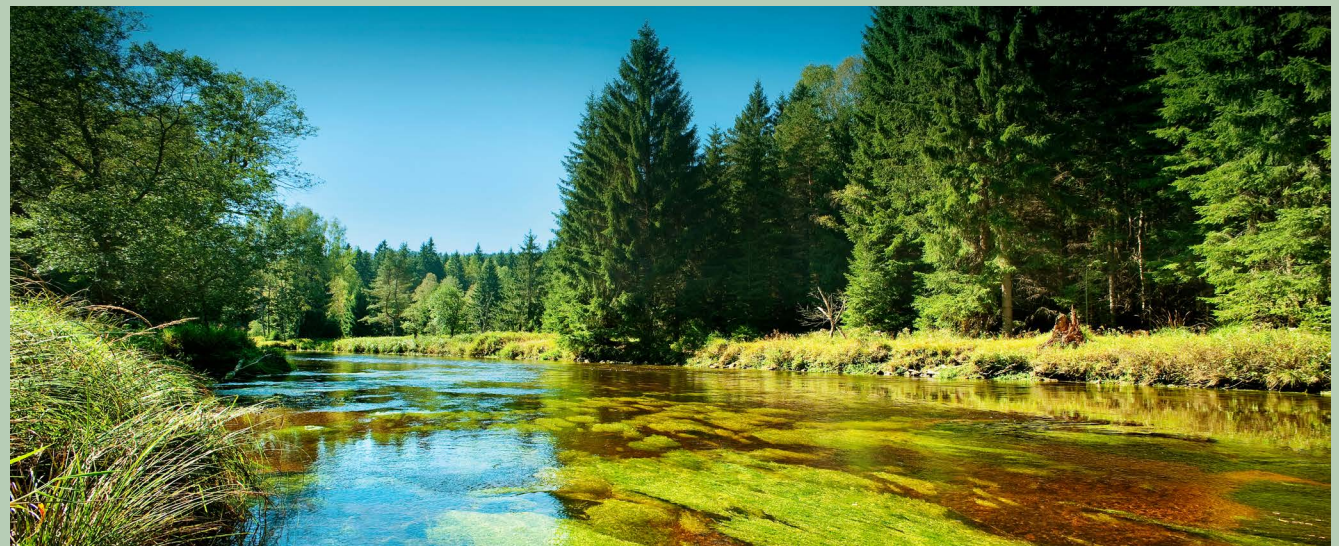
Regular update of a basin-wide catalogue of hazardous industrial, abandoned and mining sites should be further accomplished. Implementation of safety measures should be promoted and reinforced to minimize the occurrence and adverse impacts of accident events. To address the accident risk related to TMF, capacity building programs with regular training events at national or regional level need to be organized for facility operators and authority inspectors to strengthen their knowledge and skills in the field of accident prevention and contingency management. Furthermore, the

pressure of climate change impacts on water quality management is rapidly growing. Both the high intensity rainfall events and prolonged drought periods with low flow conditions may cause adverse effects (high pollutant loads and increased in-stream concentrations) if they are not counteracted by adaptation measures.

**Hydromorphological conditions** play an important role in the functioning of aquatic ecosystems and are therefore important elements with regards to the water status in the Danube River Basin. An undisturbed hydrological regime, river continuity and morphological conditions are a prerequisite for the formation of type-specific habitats for different species, but also relevant for the reduction of nutrients, adaptation to climate change and water scarcity as well as for droughts prevention. Related to hydrological regime it is

crucial to minimise negative impacts of water abstractions, impoundments and hydropeaking, while related to river continuity it is important to enable migration for aquatic organisms and transport of sediments; when it comes to morphological conditions preservation and improvements of river depth and width variation, structure and substrate of riverbed as well as structure of the riparian zone and connection between channel and floodplains/wetlands. All these aspects are crucial for good water status.

The EU Water Framework Directive has put a spotlight on hydromorphology representing an integrative role for improving the ecological status, focusing on biodiversity and ecological connectivity, for providing a better flood protection by directing towards nature-based solutions and green measures, for fighting the impacts of droughts by contribut-







ing to minimize the effects of climate change and for ensuring an attractive living environment for people.

While the topic of hydromorphology is getting more and more in the attention of people, it needs to be stated that the positive effects of restoration measures are often not immediately measurable or assessable in the (ecological) status assessment of waters and thus visible on the water status maps provided in the River Basin Management Plans. Hydromorphological related measures often provide more benefits than only the long-term improved ecological status of the waters. A better visualisation and explanation of the benefits of hydromorphological measures, also referring to the concept of “room for rivers”, is therefore seen as crucial for water managers to improve the acceptance for necessary measures by related sectors such as agriculture, navigation, hydropower or flood protection. The importance of measures related to hydromorphology with regards to the topic of water scarcity and droughts, flood protection, river continuity and ecological connectivity, or biodiversity and the creation of habitats needs to be more prominently highlighted and integrated in (spatial) planning approaches from the very beginning. Especially according to climate change and related more and more frequent extreme flood and drought events, combined solutions, addressing different objectives at the same time, are the way to success. It is crucial to identify and implement hydromorphological measures that provide multiple benefits for water management issues, but also biodiversity aspects.

Danube countries continue in their efforts in reducing inputs of nutrients and other pollutants into the **groundwater** to prevent deterioration of groundwater quality and to enable its restoration and preservation of good chemical status.

Over-abstraction of groundwater is avoided by an effective water management under consideration of climate change effects leading to a balanced water use and good groundwater quantitative status in the Danube River Basin District. In order to achieve the EU Water Framework Directive environmental objectives until 2033 and beyond it is necessary in addition to the ongoing measures to encourage deliberate and effective water consumption by the civil, agricultural and industrial consumers.

**Monitoring of water quality** provides us with information on status of our waters, which is essential for designing appropriate measures to achieve good water status in the Danube River Basin. The assessment of the ecological status according to the requirements of the WFD has been improved remarkably in the Danube River Basin and a significant support to this process was provided by the international harmonisation activities in the frame of the JDS4.

As regards the **biodiversity**, there are many different aquatic species living in the Danube. More knowledge however is needed about their composition, how does it change over time and what influences it. From the qualitative point of view the river sediment is a suitable matrix for monitoring of persistent hazardous substances because it integrates, in time and space, the pollution in a specific water body. Even though there were no specific measures addressing **sediment quality** proposed in the DRBMP 2021 it must be emphasized that all those measures foreseen in the Joint Programme of Measures for hazardous substances will be relevant for sediment quality as well. Based on the results of Joint Danube Surveys, the Danube River is significantly exposed to non-native species – 25 neophytes, 34 non-native aquatic macroinvertebrates and

17 non-native fish were recorded. Thus, the invasive alien species have become one of the major concerns for the Danube and their further classification and analysis is essential for an effective river basin management.



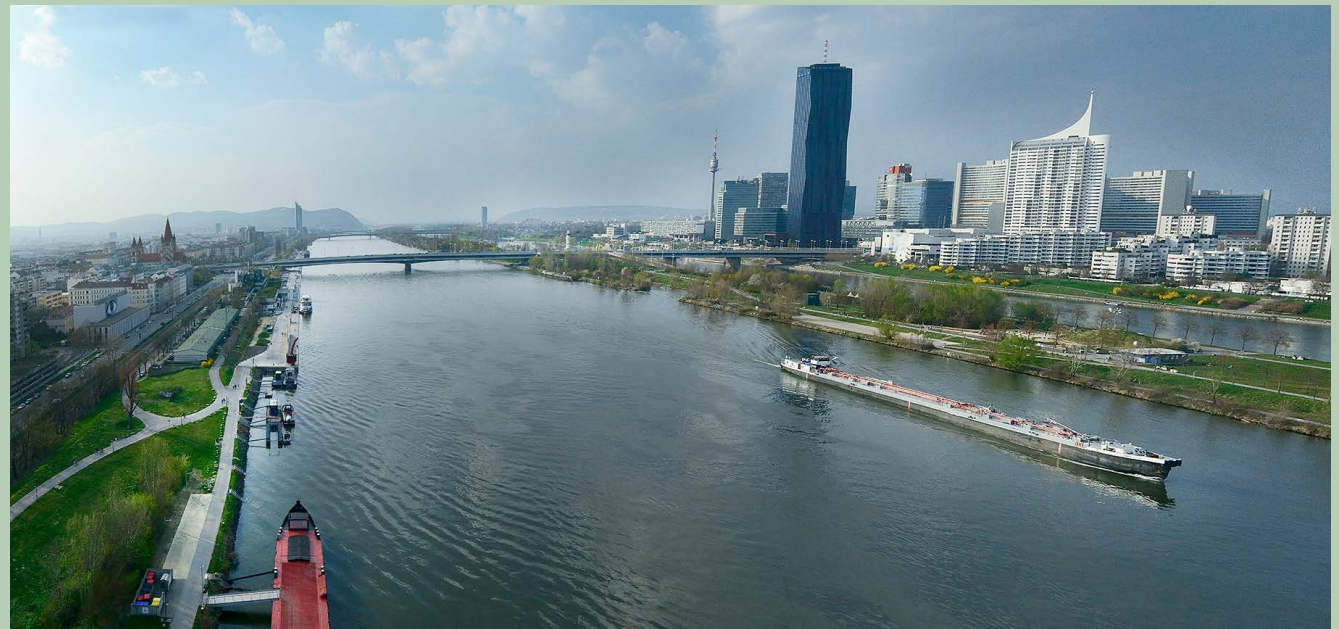
As a leader and pioneer among transboundary river basin commissions in **responding to climate change**, the ICPDR adopted the first ICPDR Strategy on Adaptation to Climate Change in 2012, updated in the year 2018. Based on its strategy, the ICPDR fully integrated climate adaptation issues in its updated Danube River Basin Management



Plan and in the first Danube Flood Risk Management Plan in 2015. The ICPDR Climate Change Adaptation Strategy does not include a separate programme of measures, but relevant actions are incorporated in activities outlined in the Danube River Basin Management Plans and Flood Risk Management Plans. Since climate change is a key cross-cutting issue, all ICPDR Expert Groups and Task Groups are mandated to fully integrate climate change adaptation in the future development of the updates of the Danube River Basin Management Plan and the Danube Flood Risk Management Plan.

The **inter-sectoral cooperation of the water management sector with other sector policies such as inland navigation, hydropower, agriculture, but also with regards to nature protection**, is an important aspect in the Danube River Basin in order to create synergies and avoid potential conflicts in transboundary water management. Considerable efforts are also being made towards the coordination of water management with the sustainable management of floods according to the EU Floods Directive (EU FD) as well as the marine environment and the Black Sea, taking into account the EU Marine Strategy Framework Directive (EU MSFD).

Talking about the flagship species of the Danube River, giant **sturgeons** migrated up the Danube as far as Regensburg on the Upper Danube. Originating 200 million years ago, sturgeons are an ancient migratory fish which is today teetering on the brink of extinction. Although sturgeons have outlasted the dinosaurs, nowadays sturgeons have become the most threatened group of animals globally according to the IUCN Red List of Threatened Species. The factors driving sturgeons to extinction are manifold and range from historical legal over-exploitation to ongoing illegal fishing, bycatch and trafficking today (stemming from improper fishery man-



agement and insufficient legal enforcement of fishing bans), blocked migration routes through dams and loss or degradation of habitats to other negative pressures such as river modification or pollution induced fish kills. Sturgeons depend on an interlinked network of habitats from rivers to the sea that provide them with suitable conditions to complete their life cycles, feed, disperse, repopulate, balance fish biomass and genetically exchange. The conservation and protection of sturgeon populations need a sustained long-term holistic approach, connecting international waters, coastal areas, and often multi-national river systems, and require a secured and long-term funding of priority conservation measures in order to suit these long-lived species.

The EU Water Framework Directive (EU WFD) is the first environmental Directive that gives a prominent role to **economic approaches** in its implementation. The EU WFD explicitly refers to an economic analysis and includes the use of economic instruments such as environmental charges and taxes. The adequate application of economic instruments for water management planning, such as cost recovery or water pricing policy tools, is important to support the implementation of EU WFD related measures to achieve the good status of water bodies. This rationale is grounded on the polluter pays principle and acknowledges the reliability of economic tools in the process of properly assessing the mitigation of environmental pressures. The WFD stipulates in its first recital that “Water is not a commercial product like any other but, rather,





a heritage that must be protected, defended, and treated as such”, underlining the importance of prioritizing the protection and sustainable management of water resources over purely commercial interests. In this respect, the water pricing policy becomes a fundamental consideration in ensuring a sustainable water resource management.

The investment value of the EU WFD Joint Programme of Measures implemented from 2009 to 2021 and estimated from 2022 until the year 2027 by Danube countries amounts to 92,7 billion EUR across the entire Danube River Basin. Out of the total of 92,7 billion EUR, and following the different EU WFD cycles, the investment value was reported with 27% spent in the 1st EU WFD cycle, 24% spent in the 2nd EU WFD cycle as well as 49% of the total EU

WFD investment value estimated to be spent in the 3rd EU WFD cycle.

Mid- and long-term national financing mechanisms to implement EU WFD related measures need to be secured by the Danube countries. EU funding instruments and external funds to support the implementation of the EU WFD are important. Strengthening the knowledge base is also crucial in relation to the performance of (innovative) economic instruments and financing schemes that may represent alternative sources of financing for countries to be adapted to the national water management, socio-economic and institutional context. Enhancing the sharing and benchmarking of practices between Danube Countries and strengthening the cooperation amongst the water

and financing sectors e.g., on economic and financing assessments, strategic financing, or innovative instruments, represent another key aspect in identifying and ensuring the most suitable funding sources.

**Public participation** is a dynamic process that actively involves the public in decision-making and places significant emphasis on considering public input within those decisions. The ICPDR has remained steadfast in its commitment to promoting public participation in its decision-making processes. This dedication stems from our firm belief that involving the public not only garners broader support for policies but also improves the efficiency of their implementation. The ICPDR wholeheartedly supports the active engagement of stakeholders and civil society at every stage of our work. From the initial conceptualisation of policies through the implementation of measures and the evaluation of their impacts, the ICPDR actively engages stake-





holders throughout the entire lifecycle of our activities. Regarding challenges, financing seems to remain a nominal problem in most Danube countries. Although there appears to be enough funds for most desired projects, there seem to be procedural and administrative issues that limit the public participation in every country on desirable scale. Public participation lies at the heart of the ICPDR's mission. The ICPDR recognizes that meaningful engagement with communities and stakeholders is essential for the success of our initiatives. The ICPDR plays a pivotal role in shaping policies by providing guidance and recommendations for policy development, as well as supporting the creation of regulatory frameworks essential for sustainable water management across the Danube River Basin. By fostering transparency, raising awareness, and ensuring accessibility of valuable educational materials, the ICPDR strives to create a collaborative environment where diverse voices shape the future of the Danube. These efforts allow to build stronger, more inclusive frameworks that not only address current challenges, but also safeguard the water resources of the shared Danube River Basin for generations to come.





**ICPDR** IKSD

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for the Protection  
of the Danube River

Internationale Kommission  
zum Schutz der Donau

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